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Idaho Operations Office

ICDF Complex Operations and Maintenance Plan

INEEL
Home of Science and Engineering Solutions
Idaho National Engineering and Environmental Laboratory

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Prepared for the
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ABSTRACT

The Operations & Maintenance (O&M) Plan describes how the Idaho National Engineering and Environmental Laboratory (INEEL) will conduct operations, winterization, and startup of the INEEL CERCLA Disposal Facility (ICDF) Complex. The ICDF Complex is the centralized INEEL environmental restoration facility that will be responsible for the receipt, storage, treatment (as necessary), and disposal of INEEL Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) remediation wastes. The ICDF Complex, including a buffer zone, will cover approximately 40 acres, with a landfill disposal capacity of approximately 510,000 yd^3. The ICDF Complex is designed and authorized to accept INEEL CERCLA-generated wastes and includes the necessary subsystems and support facilities to provide a complete waste management system. The ICDF Complex comprises the landfill, evaporation pond (two cells), leachate collection system, staging and storage areas, decontamination facility, administrative facility, and other systems necessary for operations. This O&M Plan presents the operational approach and requirements for operating the various systems/components that are a part of the ICDF. Appendix A to this O&M Plan presents procedure overviews that describe in more detail key operational procedures that will be implemented at the ICDF Complex. Each procedure overview is numbered to align with the corresponding section of the O&M Plan and will be used to develop detailed operating procedures for the ICDF Complex. Appendix B to this O&M Plan identifies the anticipated equipment needs for ICDF operations. This O&M Plan presents the planned operational process based upon an evaluation of the remedial action requirements set forth in the Operable Unit 3-13 Final Record of Decision.

CONTENTS

FIGURES

TABLES

ACRONYMS

ACL	administrative control level
ACM	asbestos-containing material
ALARA	as low as reasonable achievable
ALC	acceptable leachate concentration
ALR	action leakage rate
AOC	area of contamination
ARAR	applicable or relevant and appropriate requirement
ASA	Auditable Safety Analysis
BCG	biotic concentration guide
CAM	continuous air monitor
CAMU	Corrective Action Management Unit
CAPS	ConCover All Purpose Spray
CERCLA	Comprehensive Environmental, Response, Compensation and Liability Act
CFA	Central Facilities Area
CFL	central file location
CFS	chemical fixation and stabilization
CLP	Contract Laboratory Program
CM	configuration management
CMP	Configuration Management Plan
COC	chain of custody
COPC	contaminant of potential concern
CWID	CERCLA Waste Inventory Database
CWP	Construction Work Plan
D&D&D	deactivation, decontamination, and decommissioning
DAC	derived air concentration

DAR	Document Action Request
DCS	Distributed Control System
DMCS	Document Management Control System
DOE	Department of Energy
DOE-ID	Department of Energy Idaho Operations Office
DOT	Department of Transportation
DQO	data quality objective
ECF	Engineering Change Form
ECS	Emergency Communication System
EDF	Engineering Design File
EDM/OIS	Electronic Document Management/Optical Imaging System
ELCR	excess lifetime cancer risk
EPA	Environmental Protection Agency
ER	Environmental Restoration (Program)
FFA/CO	Federal Facility Agreement and Consent Order
FOIA	Freedom of Information Act
FRC/NARA	Federal Retention Center/National Archives and Records Administration
GCL	geosynthetic clay liner
GERT	General Employee Radiological Training
GIS	geographic information system
GM	Geiger-Mueller
HAP	hazardous air pollutant
HASP	Health and Safety Plan
HAZWOPER	Hazardous Waste Operations and Emergency Response
HDPE	high-density polyethylene
HEG	Hazard Evaluation Group

HEPA	high-efficiency particulate air (filter)
HI	hazard index
HMI	human-machine interface
HPIL	Health Physics Instrumentation Laboratory
HQ	hazard quotient
HVAC	heating, ventilating, and air conditioning
HWMA	Hazardous Waste Management Act
I&C	instrumentation and control
ICDF	INEEL CERCLA Disposal Facility
ID	identification
IDAPA	Idaho Administrative Procedures Act
IDEQ	Idaho Department of Environmental Quality
IDW	investigation-derived waste
INEEL	Idaho National Engineering and Environmental Laboratory
INTEC	Idaho Nuclear Technology and Engineering Center
IWTS	Integrated Waste Tracking System
JSA	Job Safety Analysis
LCRS	Leachate Collection Recovery System
LDR	land disposal restriction
LDRS	Leak Detection and Recovery System
LLW	low-level waste
M&O	management and operations
MCL	maximum contaminant level
MEL	master equipment list
MLLW	mixed low-level waste
NARA	National Archives and Records Administration

NESHAP	National Emission Standards for Hazardous Air Pollutants
NOAA	National Oceanic and Atmospheric Administration
O&M	operations and maintenance
OSHA	Occupational Safety and Health Act
OU	operable unit
OWTF	On-Site Waste Tracking Form
P&ID	piping and instrumentation diagram
PA	program administrator
PCB	polychlorinated biphenyl
PCM	personnel contamination monitor
PdM	predictive maintenance
PE	professional engineer
PLC	programmable logic controller
PM	project manager
PPE	personal protective equipment
QA	quality assurance
QA/QC	quality assurance/quality control
QAPjP	Quality Assurance Project Plan
RadCon	Radiological Control
RAO	remedial action objective
RAWP	Remedial Action Work Plan
RBA	Radiological Buffer Area
RCIMS	Radiological Control Information Management System
RCRA	Resource Conservation and Recovery Act
RCT	radiological control technician
RD/CWP	Remedial Design/Construction Work Plan

RD/RA	remedial design/remedial action
RMO	Records Management Organization
ROD	Record of Decision
RWP	Radiological Work Permit
SAD	site area director
SAP	Sampling and Analysis Plan
SLDRS	Secondary Leak Detection and Recovery System
SLERA	Screening Level Ecological Risk Assessment
SME	subject matter expert
SO	system operation
SRPA	Snake River Plain Aquifer
SSA	Staging and Storage Annex
SSC	structure, system, and component
SSSTF	Staging, Storage, Sizing, and Treatment Facility
SVOC	semivolatile organic compound
TAP	toxic air pollutant
TCLP	toxicity characteristic leaching procedure
TEDE	total effective dose equivalent
TFR	technical and functional requirement
TLD	thermoluminescent dosimeter
TPR	technical procedure
TRU	transuranic
TSCA	Toxic Substances Control Act
UBC	Uniform Building Code
UTS	universal treatment standard
VOC	volatile organic compound

VPP	Voluntary Protection Program
WAC	Waste Acceptance Criteria
WAG	waste area group
WGS	Waste Generator Services
WMP	Waste Management Plan

ICDF Complex Operations and Maintenance Plan

1. INTRODUCTION

This Operations and Maintenance (O&M) Plan is part of the Remedial Action Work Plan (RAWP) documentation for the INEEL CERCLA Disposal Facility (ICDF) Complex at the Idaho National Engineering and Environmental Laboratory (INEEL). The ICDF Complex is being constructed southwest of the Idaho Nuclear Technology and Engineering Center (INTEC) at Waste Area Group (WAG) 3, Operable Unit (OU) 3-13. As shown in Figure 1-1, the INTEC is located in the south-central portion of the INEEL.

The U.S. Department of Energy Idaho Operations Office (DOE-ID) authorized a remedial design/remedial action (RD/RA) for INTEC to satisfy the requirements of the WAG 3, OU 3-13, Record of Decision (ROD) (DOE-ID 1999). The ROD selected "Removal and On-Site Disposal" as the remedy for OU 3-13, Group 3, "Other Surface Soils." To support this remedy, the ROD requires that an on-Site landfill be constructed to receive Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) remediation wastes generated at the INEEL. The ICDF Complex is the on-Site facility designed and constructed to implement the ROD requirements.

As shown in Figure 1-2, the ICDF Complex is located near the southwest corner of INTEC and immediately west of the existing percolation ponds. The area of the ICDF Complex, including a buffer zone, covers approximately 40 acres, with a landfill disposal capacity of approximately 510,000 yd^3. The components of the facility include the landfill disposal cells, an evaporation pond with two cells, and the Staging, Storage, Sizing, and Treatment Facility (SSSTF), which includes the following systems, structures, and components (SSCs):

- Admin trailer
- Scale
- Decon building (with treatment area)
- Contaminated equipment pad
- Staging and storage areas (includes three staging areas, two storage areas, and two other areas to facilitate ICDF Complex operations).

The ICDF Complex will be the consolidation point for CERCLA-generated wastes within the INEEL boundaries. In addition to receiving WAG 3 waste, the landfill also will be able to receive CERCLA-generated wastes outside WAG 3 that meet the land disposal restriction (LDR) requirements in accordance with the landfill Waste Acceptance Criteria (WAC) (DOE-ID 2002a). (Waste generated within the WAG 3 area of contamination [AOC] that has not triggered placement is not required to meet LDR criteria.) Placement is defined in EPA Directive 9347.3-O5FS (EPA 1989). The ICDF landfill meets the substantive requirements of Resource Conservation and Recovery Act (RCRA) Subtitle C (42 USC 6921 et seq.), Idaho Hazardous Waste Management Act (HWMA 1983), Department of Energy (DOE) Order 435.1, and Toxic Substances Control Act (TSCA) polychlorinated biphenyl (PCB) landfill design and construction requirements (15 USC 2601 et seq.). Detailed information regarding the design and construction of the landfill can be found in the *INEEL CERCLA Disposal Facility Remedial Design/Construction Work Plan* (DOE-ID 2002b).

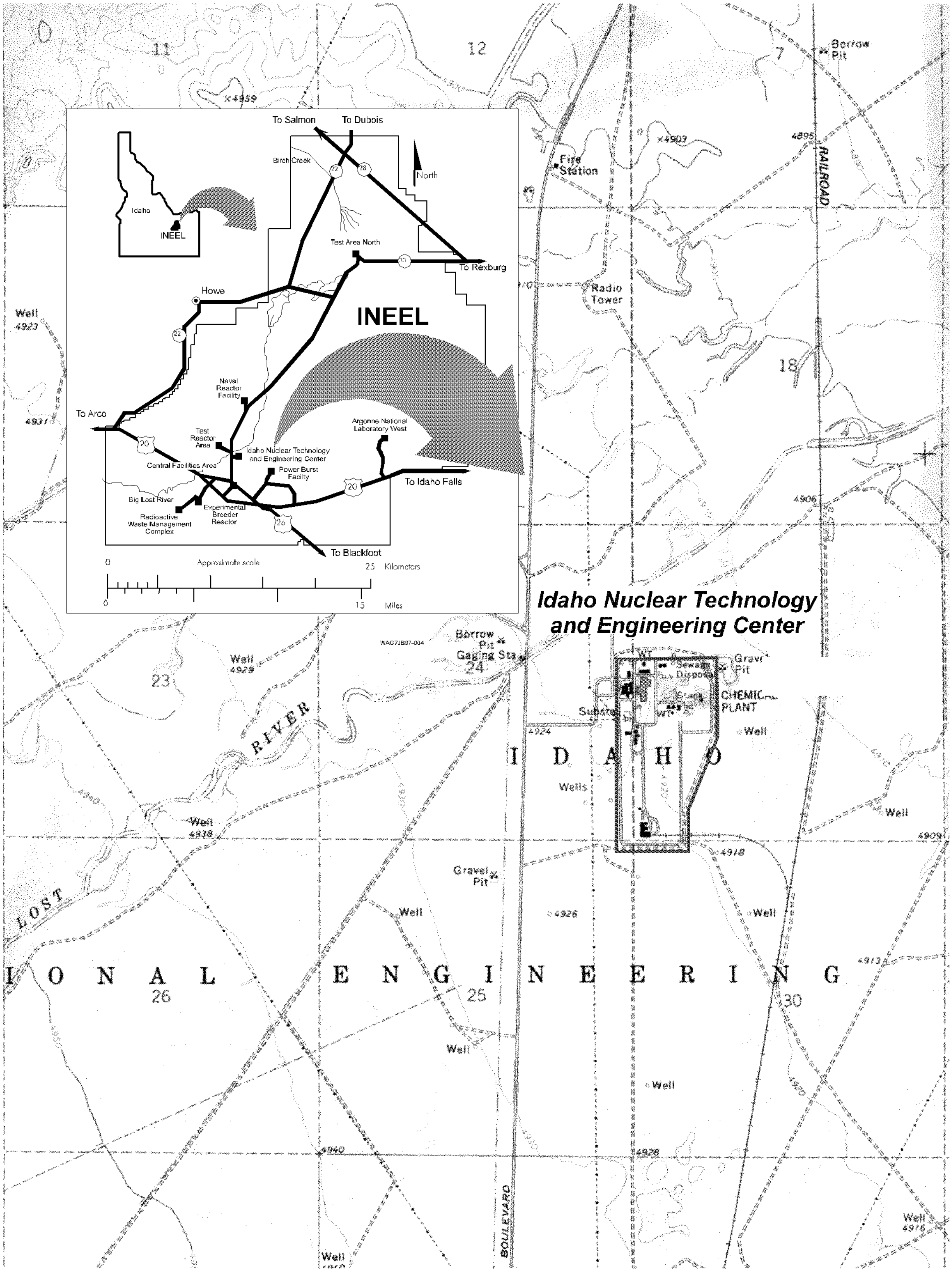

Figure 1-1. Location of the INTEC at INEEL.

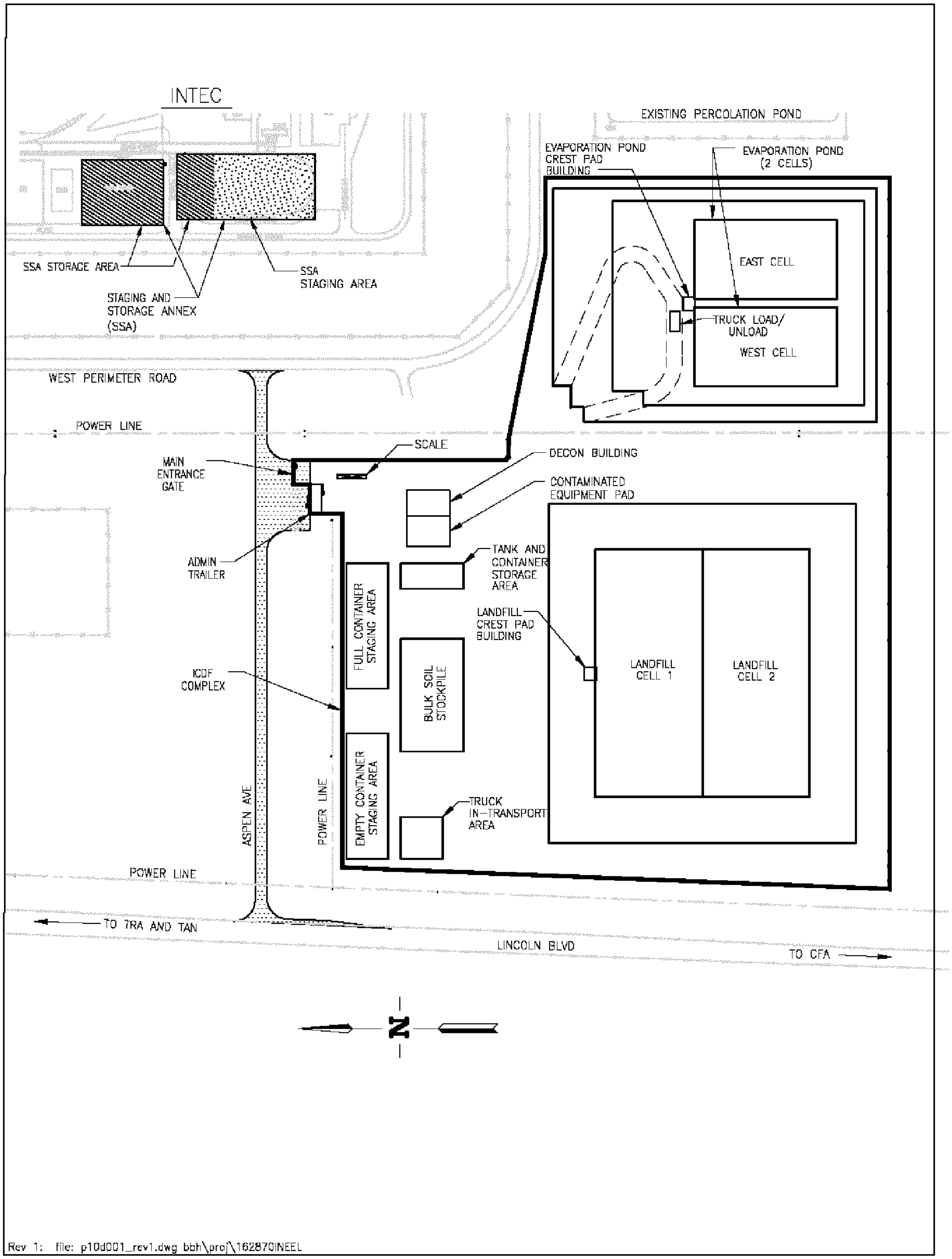

Figure 1-2. Location of the ICDF Complex components and proximity to the INTEC.

The evaporation pond, designated as an ICDF Complex RCRA Corrective Action Management Unit (CAMU) in the OU 3-13 ROD, will be the disposal site for ICDF leachate and other aqueous wastes generated as a result of operation. In addition, WAG 3 AOC aqueous wastes, such as purge water, may be disposed in the evaporation pond in accordance with the ICDF evaporation pond WAC (DOE-ID 2002c). Detailed information regarding the design and construction of the evaporation pond can be found in the *INEEL CERCLA Disposal Facility Remedial Design/Construction Work Plan* (DOE-ID 2002b).

Additional facilities will provide waste-handling operations for the ICDF Complex (e.g., receiving, staging, storing, treating, and repackaging incoming waste as necessary, for disposal in the ICDF landfill, the ICDF evaporation pond, or an off-Site facility). Detailed information regarding the design and construction of these facilities can be found in the *Remedial Design/Construction Work Plan for the Waste Area Group 3 Staging, Storage, Sizing, and Treatment Facility* (DOE-ID 2002d).

Upon final approval of the ICDF Complex RAWP, the Staging and Storage Annex (SSA) (also known as CPP-1789) inside the INTEC will become part of the ICDF Complex. The SSA currently functions as a waste storage area. The SSA will provide storage and staging of CERCLA wastes awaiting treatment or disposal in the ICDF Complex or an off-Site facility. A portion of the SSA is paved and fenced to ensure proper controls, and the southern portion of the SSA is available for staging if necessary.

This O&M Plan for the ICDF Complex is necessary to ensure compliance with regulatory requirements that provide protection of human health and the environment. This plan has been developed in accordance with the Environmental Protection Agency (EPA) fact sheet EPA 540-F-01-004 (EPA 2001) to describe activities and procedures within the ICDF Complex that satisfy the OU 3-13 ROD requirements.

The ICDF Complex O&M Manual will be a separate document that will include operating procedures to allow for the implementation of the principles and practices described in this plan. The manual will compile the detailed procedures that are developed and will be revised, as necessary, as the operations staff gain experience, gather information, and revise processes and equipment throughout the operating life cycle of the facility. Detailed operating procedures that supplement the operating procedure overviews contained in this O&M Plan will also be prepared. The detailed procedures will integrate the performance requirements and operating criteria of DOE-ID and its subcontractors to ensure safety and efficiency in operation of the ICDF Complex. The O&M Manual will be available on-Site for Agency information at the prefinal inspection.

Several other documents have been prepared to describe the operation of specific portions of the ICDF Complex and must be used concurrently with this plan. Section 1.4 of the RAWP (DOE-ID 2003a) identifies additional documents that will provide supplementary detail regarding the ICDF Complex operations.

1.1 O&M Plan Purpose and Organization

The purpose of this O&M plan is to describe the actions to be employed by the INEEL management and operating contractor at the ICDF Complex. In addition, this plan describes O&M practices to be developed in future stages of site development.

This plan was constructed as recommended by the EPA fact sheet, "Operations and Maintenance in the Superfund Program" (EPA 2001). (Similarly, the ICDF Complex O&M Manual will be consistent with that EPA fact sheet to provide the technical information and data, protocols, parameters, operational procedures, staffing, training, and maintenance schedules needed for the facility.) The information contained in this plan has been organized into the following sections:

- Section 1, Introduction. Presents O&M plan synopsis, organization, ICDF Complex facility descriptions, and operation overviews

- Section 2, ICDF Complex Operational Organization. Presents personnel organization, job descriptions, and training requirements

- Section 3, Operational Limits and Environmental Monitoring. Presents operational limits and monitoring requirements, including discussions addressing WAC, Idaho Administrative Procedures Act (IDAPA) standards, National Emission Standards for Hazardous Air Pollutants (NESHAP), risk, groundwater, radiological controls, action leakage rate, environmental monitoring and sampling, and sampling and analysis quality assurance (QA)

- Section 4, ICDF Complex Operations. Presents detailed descriptions of operations at the facility including waste tracking, CERCLA remediation site activities, waste shipment and delivery, ICDF Complex access, seasonal winterization/startup, decontamination and treatment operations, evaporation pond management, leachate management, decontamination, treatment, and waste staging, startup testing, and waste management

- Section 5, Waste Unit Designation and Operational Approach. Presents the waste management, unit designation, standards, and operational requirements for waste treatment, staging, and storage areas

- Section 6, Equipment Maintenance. Presents discussions addressing grounds and perimeter maintenance, equipment maintenance, facility maintenance, and spare parts and special tools

- Section 7, Facility Configuration Control. Presents discussions addressing the management of drawings, procedures, modifications, and records for the ICDF Complex

- Section 8, Inspections. Presents discussions addressing the various inspections, including ICDF Complex, landfill, evaporation pond, decon building (with treatment area), waste storage, and tank inspections

- Section 9, Notification and Submittals. Presents notification requirements for spills and releases, sampling event notifications and data submittals, operational reports, and emergency response and alarm condition notification and reporting

- Section 10, Records Management. Presents discussions addressing the records management requirements for the ICDF Complex

- Section 11, References. Provides a list of references for the O&M Plan.

The following are appendixes to this document:

- Appendix A, Procedure Overviews, provides a summary of the requirements for ICDF Complex operations. Each procedure overview is numbered to align with the corresponding section of the O&M Plan. The procedure overviews will be used to develop detailed operating procedures for the ICDF Complex.

- Appendix B, Equipment List, provides a tabulation of the equipment that will be used for ICDF Complex operations. The equipment is categorized by whether it is considered permanent or temporary.

1.2 ICDF Complex Components Description

The major components of the ICDF Complex are the two landfill disposal cells, an evaporation pond with two cells, admin building, weigh scale, decon building with treatment systems, and the SSA, a staging and storage area offset from the main ICDF Complex. Figure 1-2 presents the ICDF Complex layout. (Additional information is available in the *Remedial Design/Construction Work Plan for Waste Area Group 3 Staging, Storage, Sizing, and Treatment Facility* [DOE-ID 2002d] and the *ICDF Remedial Design/Construction Work Plan* [DOE-ID 2002b].)

The ICDF landfill disposal cells are designed primarily for soils and other solid wastes, whereas the ICDF evaporation pond is designed for aqueous wastes. The SSA is a staging and storage area located inside the INTEC area that provides space for containers and tanks used to store aqueous waste destined for disposal in the evaporation pond. The SSA is currently being used for staging loose soil and debris containers awaiting disposal in the landfill and/or treatment as necessary, and will continue to be used for waste staging and storage for the ICDF Complex operations. The ICDF Complex will provide centralized receiving, staging, storage, packaging, and treatment operations for waste from various INEEL CERCLA remediation/removal and investigation sites prior to the waste's disposal in the ICDF landfill or evaporation pond, or shipment off-Site.

All ICDF Complex activities take place within the WAG 3 AOC to allow flexibility in managing WAG 3 waste consolidation and remediation without triggering LDRs and/or other RCRA requirements, in accordance with the OU 3-13 ROD. The ICDF landfill and evaporation pond will accept only low-level waste (LLW), mixed low-level waste (MLLW), hazardous waste, and limited quantities of Toxic Substance Control Act (TSCA) wastes (PCB wastes and asbestos) for disposal. Definitions of LLW, MLLW, hazardous waste, and TSCA wastes are provided in Table 3-1 of the ICDF Complex Operations Waste Management Plan (DOE-ID 2003b). Other wastes not meeting the ICDF landfill WAC may be received, stored, treated, or packaged at the ICDF Complex prior to their shipment to an off-Site disposal facility as discussed in detail in Chapter 4.

The majority of the waste destined for disposal at the ICDF Complex will be contaminated soil. However, debris, aqueous waste, investigation-derived waste (IDW), which includes waste generated by CERCLA investigations (such as drill cuttings, purge water, soils, and debris), and PCB waste and asbestos will also be included in the waste inventory. ICDF Complex leachate, decontamination water, treatment system washdown water, water from CERCLA well purging, sampling, and development activities, and other WAG 3 AOC liquid wastes that meet the ICDF evaporation pond WAC will be disposed in the ICDF evaporation pond. In addition, secondary wastes generated from operations and maintenance activities, such as waste from decontamination activities, personal protective equipment (PPE), used equipment, filters, and other similar waste, will be disposed in the ICDF landfill or evaporation pond as appropriate. More detail on waste types is provided in *ICDF Complex Operations Waste Management Plan* (DOE-ID 2003b).

At the end of the ICDF Complex operational life, its facilities will be decontaminated and decommissioned and all contaminated equipment disposed in the ICDF landfill. After this process, the remaining buildings and equipment will be removed or used for future projects.

1.2.1 Administrative Facilities

The administrative facilities include a scale and an admin trailer with an office area, a public use area, restrooms, and utility rooms to support activities involving waste receipt, paperwork (electronic or hardcopy format) verification, and determination of the immediate destination of waste shipments. Access into the Complex for visitors and ICDF Complex personnel is through the main entrance gate as shown on Figure 1-2. The administrative functions include the following:

- Weighing and verifying waste coming into or out of the ICDF Complex
- Determining waste disposition/destinations
- Administering treatment verification and other quality activities
- Processing and maintaining required records associated with the waste disposition
- Performing overall management functions.

The scale is located adjacent to the admin trailer and will be used to weigh waste transport vehicles entering and leaving the ICDF Complex. (Section 1.2.1.1 contains more information regarding the scale and its functions.)

Waste receipt and paperwork (electronic or hardcopy format) verification will be completed in accordance with the requirements of the appropriate WAC. Information from incoming waste shipments will be entered into the waste tracking system by close of business the next working day. Entries into the waste tracking system will include information such as the shipment's weight and waste verification (a review of the waste to verify that it matches the waste identified on the accompanying paperwork by confirming the waste description, the number and type of containers in the shipment, etc.). The determinations of immediate destinations will identify a specific disposal or storage location for the waste. Destinations include disposal in the landfill or the evaporation pond, staging for treatment in preparation for disposal in the ICDF landfill or evaporation pond, or staging and/or storage prior to shipment for off-Site disposal as necessary.

The admin trailer will also be the location of the operations planning meetings, ongoing facility and operations training, and where electronic information is accessed. All waste data will be backed up on a real-time basis on a remote server to prevent loss of records in case of fire or other catastrophic events at the ICDF Complex.

1.2.1.1 Scale. The scale is located immediately south of the admin trailer. All waste shipments coming into the ICDF Complex are weighed and documented at this location. Tare weights of roll-on/roll-off containers will be initially obtained, and tare weights of other haul vehicles may be obtained, if necessary, when the vehicles leave the ICDF Complex. The weigh data are automatically recorded electronically into the waste database in the admin trailer. The scale has a capacity of 60 tons and an accuracy within 0.1% at full scale and is expected to accommodate standard commercial tractor-trailer units.

1.2.1.2 ICDF Complex Waste Tracking System. A waste tracking system is necessary to process waste through the ICDF Complex and to a final destination. This tracking system offers multiple functions. It permits the waste generating site personnel to submit a request to send waste to the ICDF. As part of this request, the generating site personnel submit the Material Profile. From the Material Profile, a determination is made as to whether the waste meets the WAC for the ICDF Complex. If the waste meets the WAC, the waste units are assigned an Integrated Waste Tracking System (IWTS) tracking number, in the form of a barcode and unique number, that is printed for tracking and disposition processes. The unique number follows the waste unit through the ICDF Complex and into the landfill, evaporation pond, storage/staging, or off-Site disposal.

Waste may be sent directly to the landfill or evaporation pond, moved through the stabilization process, or sent off-Site. Entries are made in a log to record the movement of waste through the ICDF Complex. Entries may be either in an electronic or hardcopy log. Finally, location coordinates of the waste in the landfill are entered into the ICDF Complex database. (PLN-914 of the ICDF Complex RAWP provides further details regarding the waste tracking system.)

1.2.2 Decon Building

The decon building is an engineered metal building, located near the landfill entrance, that provides an equipment decontamination area and an area for the treatment, if necessary, for small volumes of waste prior to disposal in the landfill. Figure 1-3 shows the building floor plan of this facility. The building is qualified under the Uniform Building Code (UBC) Type IIN construction, which stipulates noncombustible materials. The decon building has been designed to meet the substantive requirements of 40 CFR 264.1101(b); design details are provided in the SSSTF Remedial Design/Construction Work Plan (RD/CWP) (DOE-ID 2002d).

Decontamination will be available for waste transport vehicles, waste containers, and other tools and equipment as required. Before leaving the ICDF Complex, equipment and trucks will be surveyed to meet free-release criteria for radiological contamination. Any equipment that has not been decontaminated and is no longer in use is stored on a contaminated equipment pad to be constructed adjacent to the decon building. (Section 1.2.3 describes the pad in more detail.)

Dry decontamination of equipment is the preferred method; however, in circumstances where dry decontamination is not effective in removing the radiological contamination, wet decontamination methods will be used. Dry decontamination will be accomplished by scraping or brushing visually dirty areas with dedicated hand tools. After the contamination is removed from the equipment, the debris will be collected and returned to the landfill for disposal. Any secondary wastes generated will be managed using the *ICDF Complex Operations Waste Management Plan* (DOE-ID 2003b).

Wet decontamination will be accomplished using high-pressure water sprayers and manual methods as required. After decontamination, containers/equipment will be surveyed and returned to normal use, or stored at the empty container area until they are required for use. Secondary wastes, such as sludge from the oil/water separator, will be disposed of in the ICDF landfill.

The decontamination washwater resulting from these activities will drain to a sump located adjacent to the decon building, progress through an oil/water separator, and be pumped directly to the evaporation pond. Sections 1.2.3.1, 1.2.3.2, and 1.2.4 provide additional detail on these processes.

Waste requiring treatment prior to disposal will be delivered to the treatment area in the decon building or placed in a staging area until the next treatment campaign. Nondebris waste will be transferred into a mixing system where appropriate treatment blends such as cement, water, and other reagents will be added. After blending is complete, the mix will be transferred into a waste container, sampled, and staged for disposal. Treated waste that meets the ICDF landfill WAC will be disposed in the landfill. Debris will be treated by microencapsulation with Portland cement and additives as necessary to meet ICDF landfill WAC requirements. The treatment room will have a floor trench that connects to the decontamination area drain system for containment of spills and wash water. The treatment room and equipment will also include a high-efficiency particulate air (HEPA) filtered dust control ventilation system for worker protection and collection of airborne dust generated during soil treatment operations.

1.2.3 Contaminated Equipment Pad

The contaminated equipment pad, located west of and adjacent to the decon building, will be a 6-in.-thick concrete slab, posttensioned with high-strength cables to attenuate shrinkage and cracking. Additionally, the slab will be coated with a waterproof seal. Curbs will be placed around the pad, which will be sloped to drain into a trench drain that collects and transports drainage to the pump station near the decon building. Section 1.2.4 provides additional detail on the pump station.

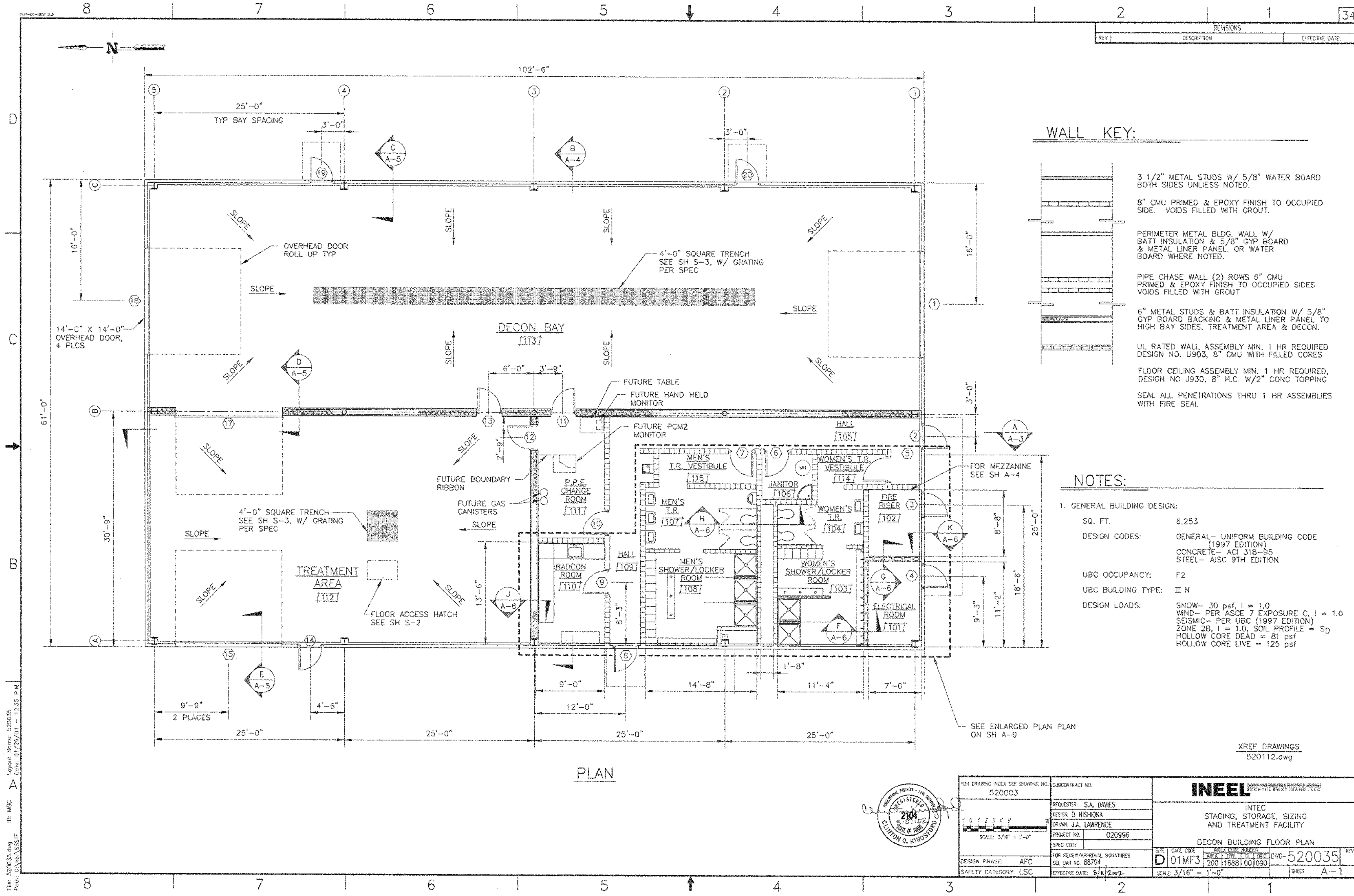

Figure 1-3. Decon building floor plan.

The contaminated equipment pad will be used for staging and storing contaminated equipment that is no longer in use. In addition to its equipment staging function, this pad is designed to temporarily store approximately 25,000 gal of spent fire water from a release inside the decon building for contamination control. Spent fire water will be transferred to the evaporation pond for disposal.

1.2.3.1 Drainage of Contaminated Water. Drain water and storm water on the contaminated equipment pad are collected in a trench drain. The drainage is directed into the decon building, through the concrete P-trap, to collect drainage from the decontamination and treatment rooms. The drain water flows from the 6-in. pipe through an oil/water separator, then into a pump station. The drain water is then pumped through a pipe from the pump station to the evaporation pond for disposal. Additional discussion regarding clean-out of these components can be found in Overview 1.2.3.1 in Appendix A of this document.

1.2.3.2 Oil/Water Separator. All drain water from the contaminated equipment pad and the decon building discharges into an oil/water separator. The oil/water separator allows the collection of petroleum products and soil particles to settle out. Additionally, the oil/water separator is designed to provide a water block to separate the outside air from the air inside the decon building similar to the concrete P-trap. A separate vent will be provided from the oil/water separator to the surface for ventilation. The piping from the drain trenches in the building and storage pad is also designed so that the bulk of sedimentation is collected in the trenches and removed from there. Additional information regarding the clean-out of the oil/water separator can be found in Overview 1.2.3.2 in Appendix A of this document.

1.2.4 Pump Station

The pump station is used to pump contaminated water from the decon building to the evaporation pond. It is designed with an inner 4-ft-diameter fiberglass shell with two submersible grinder pumps configured to operate alternately or together for a surge of drainage water from the contaminated equipment pad. The two pumps provide redundancy and extend the life of both pumps. Slide rails are placed inside the shell where the pumps can be removed from the outside surface and maintenance personnel do not have to enter the pump station. The pump station discharge piping may be disconnected at ground level so that personnel do not have to enter the sump for maintenance activities.

The pump station shell is placed inside a 6-ft-diameter concrete vault to be used as the secondary containment system. Any leakage inside the building or collection piping will drain into this vault, where detectors monitor the leakage. In the event of leakage, corrective action can be taken to drain the leakage from the concrete vault.

1.2.5 Staging and Storage Areas

Within the ICDF Complex, there are five staging or storage areas, an empty container staging area, and a truck in-transport area. Each of these areas is listed below with a brief description of its purpose. Locations of these areas are shown on Figure 1-2, and more detail about the regulatory designation, design, and operation of these areas is provided in Section 5 and Appendix A of this O&M Plan.

- Full container staging area (100 ft × 300 ft, capacity 10,000 yd^3) – Containerized waste waiting for treatment or the toxicity characteristic leaching procedure (TCLP) or other analytical results and containerized waste staged as a result of processing delays will be located in this area.

- Bulk soil stockpile staging area (150 ft × 270 ft, capacity 7,500 yd^3, modular operations concept will accommodate 2,400 to 3,000 yd^3) – This area is allocated for contaminated soil stockpile that is awaiting treatment by the treatment unit in the decon building or other bulk soil wastes that require staging. Overview 5.1 in Appendix A of this O&M Plan provides additional details regarding the design and operating requirements of the bulk soil stockpile staging area.

- Tank and container storage area (60 ft × 150 ft, capacity 56,000 gal) – The tank and container storage area is where aqueous waste in tanks and containerized wastes will be stored prior to treatment, held for off-Site disposal, or stored prior to discharge to the evaporation pond. The tank and container storage area will be the location of a storage container (20 ft × 50 ft, capacity 5,000 ft^3) designated for PCB storage.

- SSA storage area (northern portion of SSA, capacity 5,000 yd^3) – The entire SSA is currently designated a storage area under 40 CFR 262.34(a)(1). The northern portion of the SSA will remain a storage area for storage of containerized solid waste and aqueous waste in tanks prior to treatment, shipment for off-Site disposal, or discharge to the evaporation pond.

- SSA staging area (southern portion of SSA, capacity 5,000 yd^3) – This area of the SSA has been previously designated a storage area under 40 CFR 262.34(a)(1). However, the ICDF Complex transitioned this area to a staging area. Closure of the storage area is discussed in Section 5.3.

Other areas are set aside to facilitate ICDF Complex operations include the following:

- Empty container staging area (100 ft × 300 ft) – This area may hold clean, empty containers such as roll-offs, waste boxes, etc.

- Truck in-transport area (100 ft × 100 ft) – The purpose of this area is to allow for truck parking until resolution of waste acceptance with the ICDF Complex user. Should conditions arise which prevent the off-loading or transportation of containers, the vehicle may be parked inside this area.

1.2.6 Waste Treatment

As noted in Section 1.2.2, the decon building provides treatment capabilities to treat INEEL CERCLA wastes and secondary waste streams generated during ICDF Complex operations. Waste stabilization or treatment may be necessary for solid, aqueous liquid, or sludge. The purpose of treatment is to prepare INEEL CERCLA waste that does not meet the ICDF landfill WAC for final disposal in the ICDF landfill or at an off-Site disposal facility. The object of stabilization is to produce a treated waste that will (1) reduce the heavy metal leachability to LDR/universal treatment standard (UTS) concentrations to meet the ICDF landfill WAC and (2) exhibit no free liquid. Aqueous wastes that do not meet the evaporation pond WAC (e.g., petroleum-contaminated media from the oil/water separator) may be used for stabilization of soils, or held until appropriate on-Site or off-Site treatment, storage, or disposal is arranged. The main components of the stabilization process are the vertical lift tipper (used to lift waste containers and dump them into the treatment unit), a mixer unit, a bulk-bag unloader (for unloading reagent into the mixer unit), roll-on/roll-off container for collecting the treated waste from the mixer, and an air filtration system with baghouse/HEPA filter to collect particulate from the air. A schematic showing the main components of the process and a brief description and function of each process component is provided in Section 4 of this O&M Plan. Further details about the process operation can be found in Appendix A of this O&M Plan.

Treatment of hazardous debris, subject to the "Treatment Standards for Hazardous Debris," (40 CFR 268.45) also will be performed at the decon building using Portland cement-based microencapsulation for debris wastes that require treatment prior to disposal. Microencapsulation encases the hazardous debris in inorganic materials (Portland cement concrete) to substantially reduce the surface exposure to potential leaching media. The components to the debris treatment process are the grout hopper/reservoir, positive displacement pump, hose, and box brace. Debris treatment equipment is portable and will be used in either the treatment area or decon bay of the decon building. For more details about the debris treatment process, see Section 4 and Appendix A of this O&M Plan.

Waste sizing will be conducted at the CERCLA remediation site to meet the ICDF Complex and landfill WAC as described in DOE-ID (2002e) and DOE-ID (2002a).

Additional information related to waste treatment of soils is provided in EDF-ER-296, "Process and Treatment Overview for the Minimum Treatment Process." EDF-1730, "Staging, Storage, Sizing, and Treatment Facility (SSSTF) Debris Treatment Process Selection and Design," addresses the methods for selecting a debris treatment technology.

1.2.7 Landfill Cells

During the initial operating period, the landfill will consist of Cell 1 (approximately 850 ft × 400 ft). As Cell 1 is filled, the landfill will be expanded with an adjoining second cell constructed to the south. Cells 1 and 2 will share common exterior berms and both the liner and the leachate collection system of Cell 1 will be extended into the new cell. Figure 1-4 shows the layout of the landfill with build-out of the two cells.

The landfill was constructed with a multilayered liner and sump system to facilitate drainage and prevent leakage. The side slope liner is the same, with the exception of the substitution of a primary geocomposite drainage layer above the primary geomembrane in place of the gravel drainage layer. The bottom lining system consists of the following components, from top to bottom:

- A 3-ft-thick operations layer
- 12-in. gravel drainage layer
- A geotextile cushion (12-oz nonwoven filter fabric)
- A 60-mil textured primary high-density polyethylene (HDPE) geomembrane
- An internally reinforced geosynthetic clay layer (GCL)
- A leak detection drainage layer geocomposite – Leak Detection and Recovery System (LDRS)
- A 60-mil textured secondary HDPE geomembrane
- A 3-ft-thick low-permeability compacted soil bentonite liner (CSB).

Beneath the bottom liner system along the centerline of the landfill and leachate collection sump area is a Secondary Leak Detection Recovery System (SLDRS). This system is comprised of, from top to bottom, a separation geotextile, operations layer drainage gravel, SLDRS collection pipe, cushion geotextile, and a 60-mil textured HDPE geomembrane. In some areas of the SLDRS, a drainage composite substitutes for the separation geotextile, gravel, and collection pipe. The system drawings (DOE-ID 2002b) and Technical Specifications (SPC-1476) offer complete construction details of the liner and sump areas.

1.2.7.1 Leachate Collection Recovery System. The Leachate Collection Recovery System (LCRS) consists of the in-cell drainage/sumps, collection piping, and the evaporation pond. The purpose of the LCRS is to collect the primary, secondary, and tertiary leachate and allow for disposition of the leachate collected. Any precipitation that falls within the lined area, including precipitation that falls and collects over the surface of disposal areas, will be collected and treated as leachate. The LCRS contains high-flow and low-flow leachate pumps and access for collection pipe clean-outs.

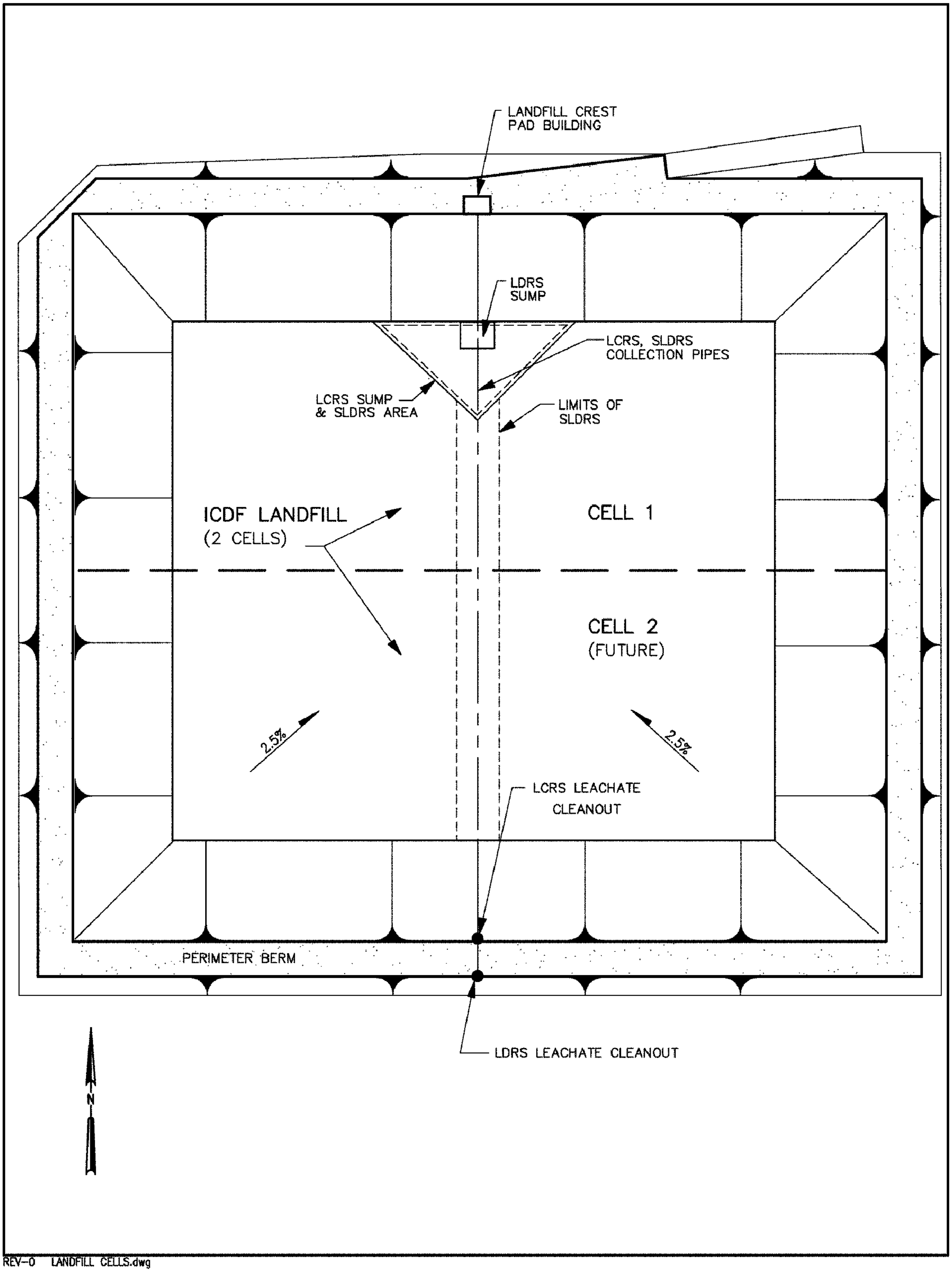

Figure 1-4. ICDF landfill cells layout.

1.2.8 Evaporation Pond

The evaporation pond has a 4.4M-gal capacity with two cells that accept aqueous wastes, such as leachate and other liquid waste sources from WAG 3 or incidentals from ICDF Complex operations. The water associated with the wastes will evaporate, leaving behind the solid materials. In the unlikely event the ponds cannot receive liquid wastes (such as downtime for maintenance activities or capacity reasons), liquid wastes could be removed through the truck loading and unloading station.

The construction of the evaporation pond includes a liner system to prevent infiltration into the surrounding soil. The liner consists of the following layers, from top to bottom:

- Two 60-mil HDPE geomembrane layers (sacrificial and primary). The sacrificial layer is textured HDPE while the primary is smooth.

- An internally reinforced primary GCL layer.

- A 3-ft sand/gravel drainage layer to serve a dual purpose as leak detection drain layer and freeze/thaw protection for underlying GCL. On the bottom of the ponds, the 3-ft-thick drainage layer will consist of a minimum 1 ft of material with hydraulic conductivity greater than 0.1 cm/sec. A drainage layer geocomposite is used on the side slopes, similar to the landfill.

- A geotextile cushion (12-oz nonwoven filter fabric, bottom of ponds only).

- A 60-mil textured secondary HDPE geomembrane layer.

- An internally reinforced secondary GCL layer.

- A 1-ft-thick base soil layer consisting of natural silt and clay.

Figure 1-5 depicts the pond cell layout.

1.2.9 Crest Pad Buildings

The ICDF landfill and evaporation pond crest pad buildings serve as valve control and monitoring stations for the leachate handling systems. Two crest pad buildings are included for the facility, one at the top of the north berm at the ICDF landfill and one on the north side of the evaporation ponds. Each crest pad building houses the motor control centers for the leachate handling and transfer pumps and contains the programmable logic control centers for operation of pumps and monitoring of flows, leachate levels, and pumps. The crest pad building floor slabs are designed as containment sumps for facilitation of leachate system operation and maintenance. Figure 1-6 provides a general overview of the foundation layout and elevation views of the crest pad buildings, which were developed from the construction drawings P-205 and P-206 of the crest pad buildings (DOE-ID 2002b). Adjacent to the evaporation pond crest pad will be a truck loading/unloading station for off-loading liquid waste hauled by tanker truck or for removal of excess liquid volume from the cells. Figure 1-7 depicts the truck loading and unloading station.

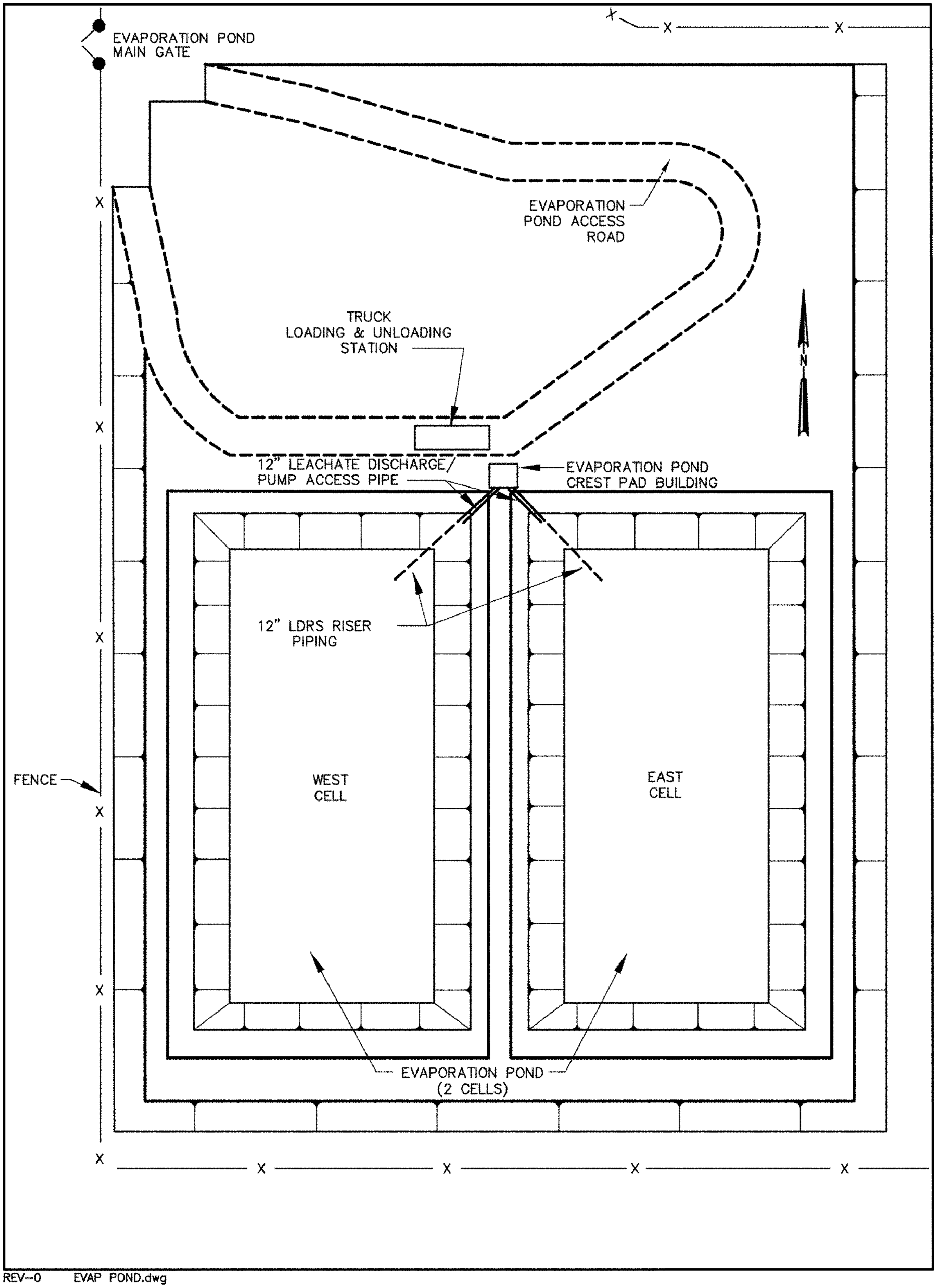

Figure 1-5. ICDF evaporation pond cell layout and component location.

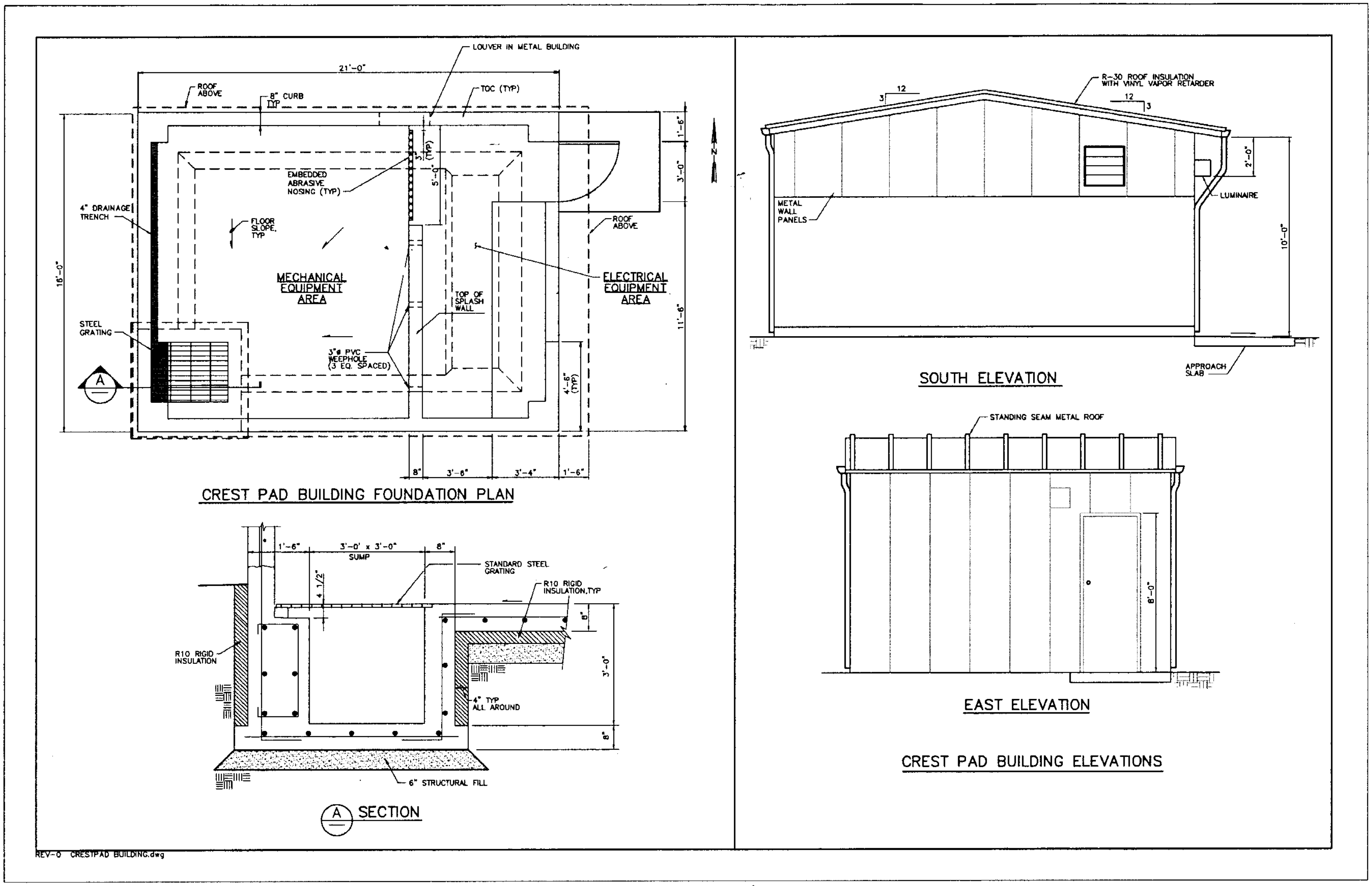

Figure 1-6. Crest pad building foundation and elevation views.

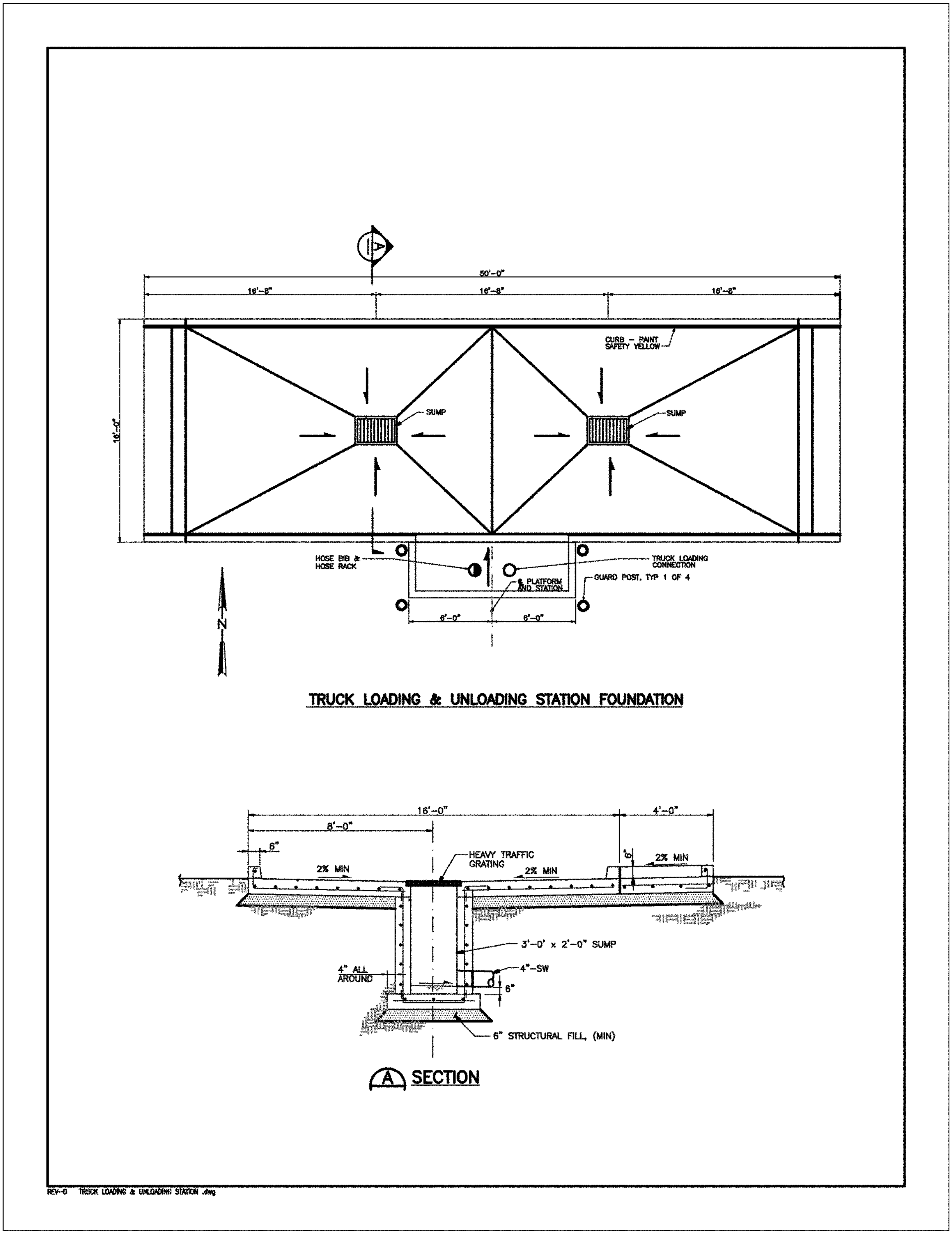

Figure 1-7. Truck loading and unloading station layout.

1.2.10 Groundwater Monitoring System

A groundwater detection monitoring system was installed in the Snake River Plain Aquifer (SRPA) to comply with substantive applicable or relevant and appropriate requirements of 40 CFR 264, Subpart F, of the RCRA, identified in Table 12-3 of the OU 3-13 ROD (DOE-ID 1999). Four rounds of water samples have been collected from the SRPA and perched water to establish background water quality. Five new downgradient aquifer monitoring wells and one existing upgradient well will be used for the SRPA detection monitoring. Further details on groundwater monitoring are provided in *ICDF Complex Groundwater Monitoring Plan* (DOE-ID 2002f). Perched water, when present, will be monitored for water quality. Due to the limited extent and transient nature of perched water, a decision as to whether the perched water will be part of the detection monitoring network and how to evaluate the data will be made by the Agencies in spring 2003 following an evaluation of the data.

1.3 Operational Overview

The subsections below describe the general processes and steps required to move waste from a waste generating site, through the operations and systems of the ICDF Complex, and into the ICDF landfill or evaporation pond for disposal. It should be noted that the steps presented in the accompanying flowcharts for these processes are based on the assumption that all waste characterization and Material Profile approvals satisfy the appropriate receiving unit WAC within the ICDF (DOE-ID 2002a; DOE-ID 2002c).

1.3.1 Process for Waste Destined for the ICDF Landfill

The process for waste destined for the ICDF landfill is shown in the flowchart presented in Figure 1-8. This flow chart includes a basic overview of the waste process before it arrives at the ICDF landfill. The general waste process described is applicable for wastes arriving in any form, whether by truck or contained in roll-offs, waste boxes, or other waste forms (monoliths, for example). Verification sampling will be conducted in accordance with DOE-ID (2003d). The information below provides a brief description of each of the steps for waste disposal operations. Note these processes have been established to facilitate clean operations as discussed in more detail in Chapter 4.

1. CERCLA-generated wastes from the INEEL will be transported to the ICDF Complex. The disposal of wastes will be based on compliance with the applicable ICDF WAC for each specific type of waste. The waste generator contractors at each specific CERCLA site prior to shipment will be responsible for excavating the wastes, obtaining radiological control technician (RCT) release prior to transport, and transporting the waste to the ICDF Complex.

2. Waste enters the facility through the gates at the ICDF Complex. Gates and access will be controlled by ICDF Complex personnel to ensure that unauthorized access is not allowed.

3. When the waste load arrives at the ICDF Complex, personnel will verify that the shipment is scheduled for receipt before accepting the waste. If the On-Site Waste Tracking Form (OWTF) is not approved for disposal of the waste, it will be sent to the truck in-transport area until the issue is corrected. If the discrepancy cannot be corrected within 10 working days, the waste will be returned to the generator, assuming the shipment back to the generator would not violate Department of Transportation (DOT) regulations. The return of the waste to the generator will require the generating site to have the capability of accepting these returned wastes. The waste in the truck in-transport area may be moved into ICDF Complex staging or storage areas, as long as the waste meets the criteria for these areas. Waste will be weighed and appropriately staged, stored, and treated as applicable for ultimate disposal. Note that all waste sizing will be conducted at the CERCLA remediation site to meet the ICDF Complex and landfill WAC.

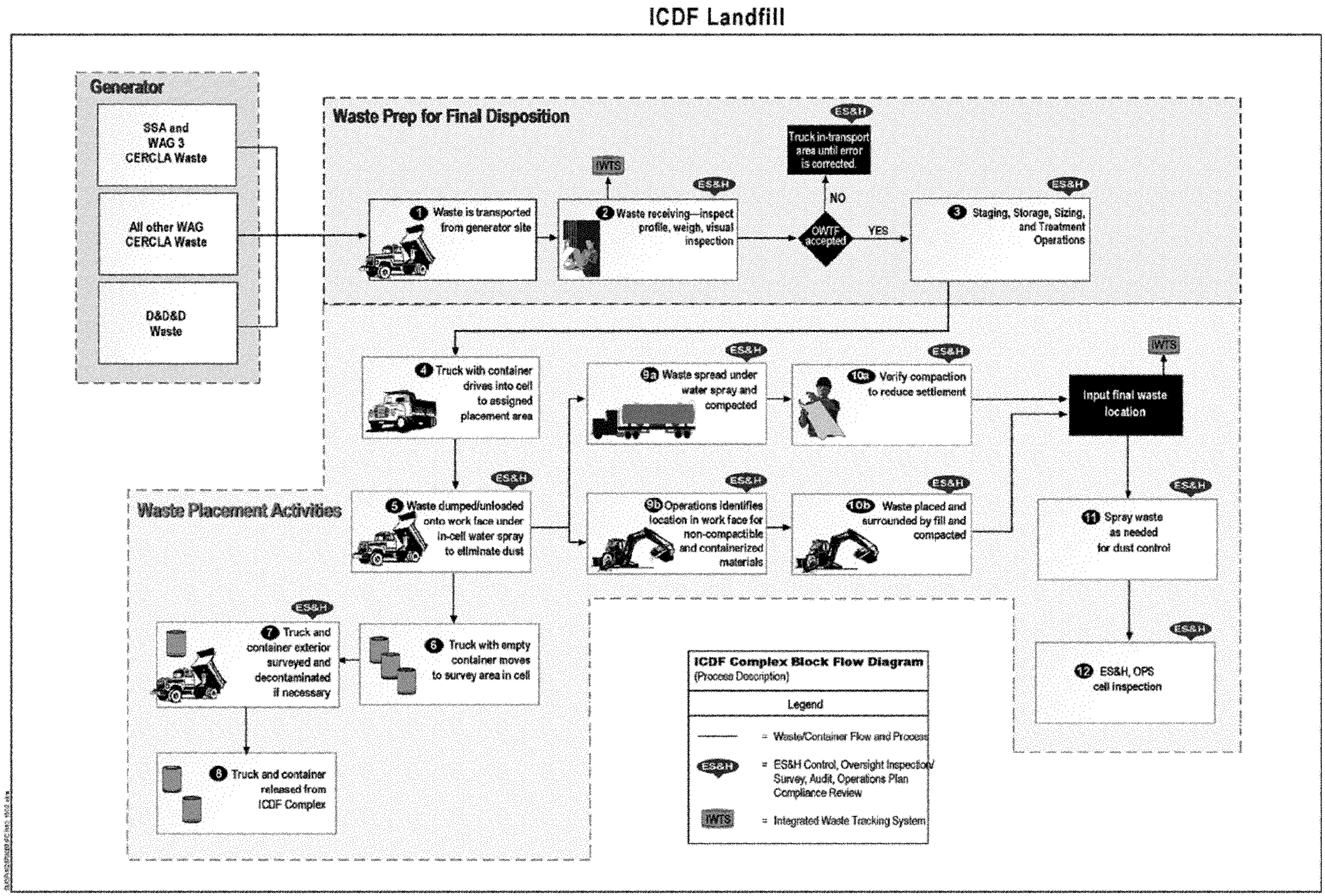

Figure 1-8. Process of waste destined for ICDF landfill.

4. If the waste is approved for disposal, the truck will be directed to the assigned disposal location within the landfill cell. Containerized waste can be staged and transported to the landfill by ICDF Complex equipment.

5. The waste will then be unloaded at the work face. Water will be used, if necessary, to minimize dust generation.

6. When the truck has finished unloading waste, it will be moved forward away from the active face of the landfill to a survey area for a preliminary radiological survey.

7. The outside of the truck (gate area, rear tires, and rear truck frame) and empty waste container will be more thoroughly surveyed by an RCT once out of the landfill to meet free-release criteria for radiological contamination (to be released from the ICDF Complex). Contamination above the release criteria on the truck or container will be removed by brushing, scraping, or other dry decontamination methods if possible. Wet decontamination methods (such as water spray steam cleaning) may be necessary under certain circumstances (such as specific health and safety protocols) and may require special equipment to perform.

8. After passing the free-release criteria for radiological contamination performed by the RCT, the truck and/or empty waste container will be released from the ICDF Complex or placed in the empty container storage area. In circumstances where the tare weight of the truck and/or the container have not been documented, the truck and container will be weighed leaving the facility or before drop-off at the empty container storage area.

9a. The loose soil waste will be spread approximately 1-ft thick within the active waste tracking grid(s) and compacted. Additional water will be added as necessary to aid compaction and reduce voids.

9b. A location will be identified at the working face for placement of debris such as containers, drums, etc. Debris will be placed and surrounded by compacted soil wastes. Depending on the type of debris, recommendations from the Waste Placement Plan (EDF-ER-286) will be followed to ensure adequate compaction of soil waste around the debris.

10a. Compaction of the soil wastes will be verified by use of a nuclear density field gauge, Humbolt Geogauge[a], or equivalent at a prescribed fill yardage frequency. See Chapter 4 and Appendix A of this O&M Plan for further details.

10b. Compaction of the soil wastes surrounding the noncompactable and containerized materials will be verified by the use of a nuclear density field gauge, Humbolt GeoGauge, or equivalent. See Chapter 4 and Appendix A of this plan for further details.

11. Control materials and application of water will be used to limit airborne emissions. If necessary, fixatives or temporary covers may be used.

12. Weekly inspections and inspections after storms are required by 40 CFR 264.303 (b) for the landfill. Inspections following a storm or other event will be conducted within 24 hours following the storm.

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a. The Humbolt GeoGauge may only be used after Agency approval of the test demonstration.

1.3.2 Process for Waste Destined for ICDF Evaporation Pond

The process for waste destined for the ICDF evaporation pond is shown in the flow chart presented in Figure 1-9. This flow chart includes a basic overview of the waste process before it arrives at the ICDF evaporation pond. The listed information below provides a brief description of each of the steps for waste disposal operations.

1. Approved WAG 3 CERCLA liquid waste will be transported from other WAG 3 sites. Approved wastes, identified in the evaporation pond WAC (DOE-ID 2002c), include the following:
   a. Aqueous wastes generated in the ICDF Complex and from WAG 3 CERCLA investigative, remedial, and removal activities, including purge water and development water from monitoring wells.
   b. Secondary aqueous wastes from waste processing and decontamination activities associated with the ICDF Complex operations.
2. When the waste arrives at the ICDF Complex, personnel will verify that the shipment is acceptable for receipt.
   a. For wastes other than leachate from the ICDF landfill, the specific evaporation pond cell that receives the waste will be recorded on the Material Profile.
   b. If the OWTF is not approved, it will be sent to the truck in-transport area until the issue is corrected. If the discrepancy cannot be corrected within 10 working days, the waste will be returned to the generator, assuming the shipment back to the generator would not violate DOT regulations. The return of the waste to the generator will require the generating site to have the capability of accepting these returned wastes. The waste in the truck in-transport area may be moved into ICDF Complex staging or storage areas, as long as the waste meets the criteria for these areas.
   c. Liquid wastes received at the ICDF Complex will be measured in gallons and thus will not require the load to be weighed.
3. For wastes disposed at the evaporation pond truck loading and unloading station, the waste will be pumped to the evaporation pond through the evaporation pond crest pad building.
4. The leachate from the ICDF landfill sump will be pumped to the evaporation pond. The leachate will gravity-drain to the leachate collection sumps where the levels will be monitored. A high-flow pump and low-flow pump are installed in the landfill LCRS sump to handle the expected range of leachate during the life of the landfill. The evaporation pond crest pad building will include flow meters and control panels for operation and recording of critical data. Decontamination and washdown water from the decon building will also be pumped to the evaporation pond through the evaporation pond crest pad building.
5. Raw water makeup capabilities will be provided from the INEEL raw water system to keep the liquid level of the evaporation pond above any potential sediment. The sediments will be kept under water to prevent any potential migration due to drying out and dust generation. Sediments that accumulate in the evaporation pond may be sprayed to move the sediments to the low point collection area. This will minimize the area of sediment distribution and will also minimize the addition of raw makeup water.
6. The decision will be made by the operations personnel as to which cell of the evaporation pond will be active at any one time. The influent piping has the capability to split flows into either cell of the evaporation pond.

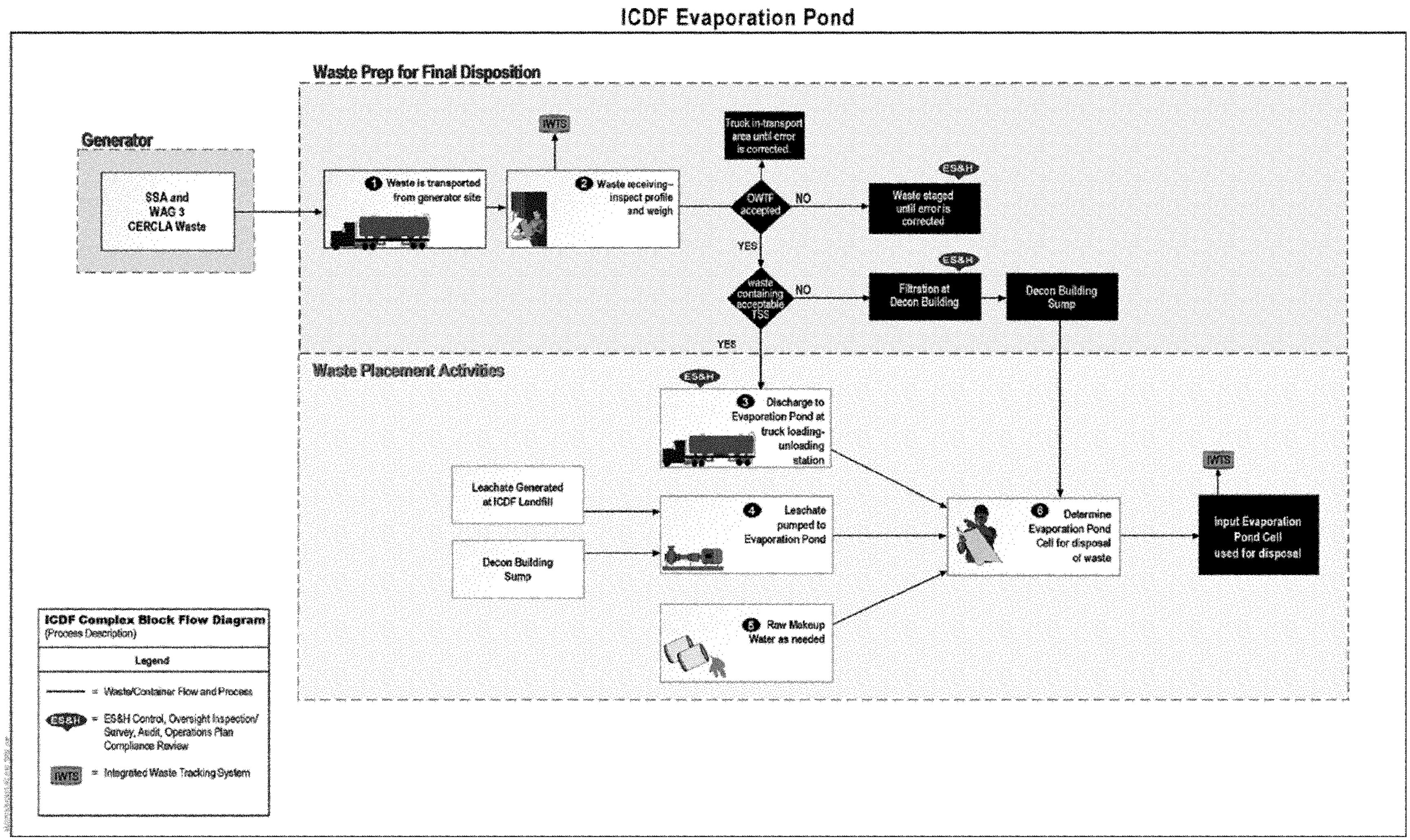

Figure 1-9. Process of waste destined for ICDF evaporation pond.

2. ICDF COMPLEX OPERATIONAL ORGANIZATION

This section discusses the expected organization, responsibilities, and training for the ICDF personnel.

2.1 ICDF Complex Organizational Chart

The ICDF Complex management and operations team are the ICDF personnel assigned to operate the facility and to receive, stage, store, size, treat, and/or transport waste. Figure 2-1 is an organizational chart for the anticipated ICDF team. Assigned responsibilities for each position are briefly discussed in the following text.

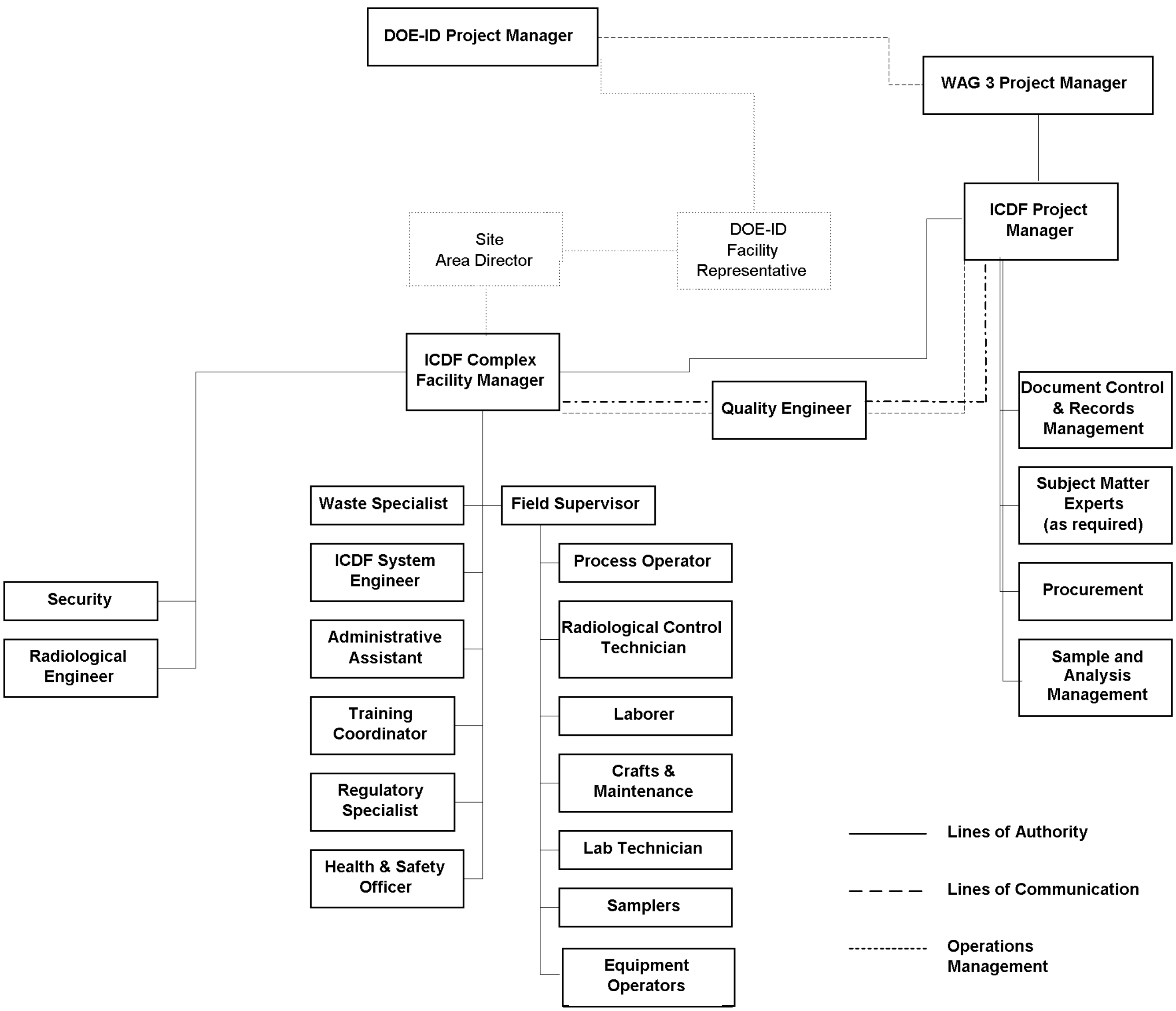

Figure 2-1. ICDF organizational chart.

2.2 ICDF Complex Roles and Responsibilities

The following lists the expected roles and responsibilities of the ICDF personnel.

2.2.1 ICDF Management Team

The ICDF management team comprises senior managers who are responsible for establishing the vision and goals for operation of the ICDF Complex. In addition, they are responsible to ensure the facility operates in a manner that protects the worker, the public, and the environment. The management team also addresses vulnerabilities such as legal, financial, security, etc., and is responsible for ensuring compliance with applicable laws and regulations during operations and maintenance at the ICDF.

DOE-ID project manager – The DOE-ID OU 3-13 remediation project manager (PM) is responsible for ensuring that the ICDF Complex operations and maintenance activities are performed in accordance with the approved O&M Plan. All activities shall be coordinated with the INEEL operating contractor at WAG 3, OU 3-13. The DOE-ID remediation PM approves the annual operating and maintenance report.

DOE-ID facility representative – This position is responsible for DOE oversight of the facility to ensure that the contractor is operating facilities safely and efficiently (i.e., within the boundaries of those controls invoked in the facility authorization basis); the contractor's management system is effectively controlling conduct of operations and implementing integrated safety management objectives, principles, and functions; DOE line/program managers are cognizant of the operational performance of facility contractors; and effective lines of communication between DOE and its operating contractors are maintained during periods of normal operation and following reportable events, in accordance with DOE orders and requirements.

Site area director – The site area director (SAD) is responsible for the safe operations of all the facilities. A more detailed description of these responsibilities is included in the ICDF Health and Safety Plan (HASP) (INEEL 2003). All personnel working or visiting the ICDF Complex are under the jurisdiction of the INTEC SAD.

WAG 3 project manager – The WAG 3 PM is responsible for the overall scope, schedule, and budget for WAG 3 activities, including the ICDF project. The responsibilities also include ensuring that projects are performed in accordance with the applicable requirements and interfaces with external and internal stakeholders are defined and maintained.

ICDF project manager – As point of contact, the ICDF PM has overall responsibility for project execution, budgets, and schedule and ensuring that the project performs in accordance with customer and management expectations. The ICDF PM is responsible for providing oversight of the day-to-day operations of the ICDF Complex, which includes ensuring implementation of identified regulatory requirements, implementation of all waste tracking requirements, implementation of the WAC, implementation of inspections using personnel trained to the requirements of this plan, and health and safety of all ICDF Complex personnel. The ICDF PM and the ICDF Complex facility manager work together to ensure that the ICDF Complex is operated in accordance with this RAWP.

ICDF Complex facility manager – This position is responsible for ensuring the ICDF Complex is operated within the approved authorization basis, operates within regulations, and provides protection of human health and the environment. The facility manager defines specific areas of responsibility for other team members. The facility manager also ensures that appropriate interface agreements are developed, personnel are trained and qualified for their job assignments, INEEL and ICDF policies and procedures are followed, and works with the ICDF PM to establish the budget for safe operations of the facility. The facility manager's responsibility includes implementation of all the requirements of this plan, implementation of O&M requirements, coordination of O&M activities, and control of the O&M reports, operating record, and project files.

Quality engineer – This position is responsible for assisting with the implementation of quality assurance requirements, performing routine surveillance, reviewing purchase requisitions, assisting with nonconformance reporting and dispositioning, verifying implementation of corrective actions, participating in external audits, reviewing operating documents, and verifying implementation of the QA program. This position provides support to both the ICDF Complex facility manager and the ICDF PM.

The O&M staff includes the minimum number of individuals required to adequately staff typical year-round operations at the ICDF Complex. The positions described in Sections 2.2.2 and 2.2.3 require support on a dedicated basis. Some positions are not full-time. Other positions may require more than one individual to meet operational needs. Positions will be staffed as required to ensure safe and efficient operations of the ICDF Complex.

2.2.2 ICDF Project Support

The following personnel are direct reports to the ICDF PM. They aid the PM to ensure that the ICDF Complex is operated in accordance with applicable regulations, the design documents, and the approved RD/RA Work Plans.

Document control and records management – This position is responsible for ensuring that documents and operational data generated during operations are filed and maintained in accordance with company procedures.

Subject matter experts – These positions are responsible for additional support, as required, during ICDF operations. Subject matter experts possess the necessary skills, training, and/or education to qualify them to aid in identifying and implementing solutions to problems. These personnel may be either INEEL employees or subcontractors hired for their particular expertise.

Procurement – This position is responsible for assisting the ICDF project team in procuring materials and/or services that will be required for the safe operation of the facility. Procurement ensures quality products and services are bought at a fair and reasonable price, promotes effective competition, utilizes capable and reliable suppliers, and maintains high professional and ethical standards.

Sample Analysis Management office – This position is responsible for identifying laboratories qualified to perform the analytical analysis of samples. This position also ensures that the chain of custody (COC) is maintained and verifies that sample results returned from the laboratories are correct and meet the requirements of the subcontract.

2.2.3 ICDF O&M Staff and Support

This section covers all the positions currently required to staff and support ICDF operations and maintenance.

2.2.3.1 ICDF O&M Support.

Security – This position is responsible for providing property protection support when the facility is not manned. Existing INEEL security forces are utilized and perform their duties in accordance with INEEL procedures.

Radiological engineer – This position is responsible for providing radiological technical guidance to the ICDF operations team, interpreting and implementing INEEL's radiological requirements, reviewing operation and maintenance procedures to ensure the INEEL's Radiological Control (RadCon) program is properly implemented, and providing evaluation and feedback to the ICDF project team. This position is also responsible for reviewing operating procedures and maintenance work orders to ensure that radiological controls are properly addressed.

2.2.3.2 ICDF O&M Staff. The following positions are direct reports to the ICDF Complex facility manager:

Waste specialist – This position is responsible for the shipment profiles and waste certifications and will be present at the dig face to verify shipments. The position also provides oversight of verification sampling and other functions that are detailed in DOE-ID (2003d), PLN-914, and DOE-ID (2003c) (Appendixes B, C, and D of the RAWP). The position is the gatekeeper to the ICDF Complex and has the authority to stop shipments that are outside the agreed-upon parameters. This position is responsible to work with the ICDF Complex user for scheduling the receipt of waste into the ICDF Complex and input all required data into the database to maintain the waste inventory; complete the waste tracking process; and receive, track, and document the waste certification and transportation information.

ICDF facility engineer –This position is responsible for providing engineering guidance for the day-to-day operations of the ICDF. The facility engineer writes maintenance/repair procedures; reviews, investigates, and analyzes basic SSCs[b] and recommends/provides solutions; and provides technical support to the ICDF facility manager for the day-to-day operations of the facility. This position also has overall technical responsibility for the SSCs within the ICDF Complex. This includes possessing a thorough technical understanding of the SSCs and their operating principles; developing and maintaining the technical baseline; ensuring their technical adequacy; being aware of their status, especially during system changes; monitoring performance; overseeing and approving modifications; and overseeing the maintenance program.

Administrative assistant – This position is responsible for providing administrative support to the ICDF operations team.

Training coordinator – This position is responsible for preparing training plans; developing necessary coursework, which includes classroom presentations and materials; and delivering training to the ICDF operations team. (See Section 2.3 below for additional information.)

Regulatory specialist – This position is responsible for providing guidance and technical support on environmental regulatory compliance. This includes responsibility for environmental oversight of inspections, environmental reporting, and environmental monitoring for the ICDF Complex. Monitoring activities include ensuring compliance with NESHAP, IDAPA, and identified operational limits.

Health and safety officer – This position is responsible for ensuring the ICDF Complex is operated within the approved authorization basis, operates within regulations, and provides protection for human health and the environment. The health and safety officer monitors the effects of divergent waste streams on the facility, ensures compliance with the Occupational Safety and Health Act (OSHA) and the HASP, and establishes and audits training requirements.

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b. Structures are elements that provide support or enclosure, such as buildings, freestanding tanks, basins, dikes, and stacks. Systems are collections of components assembled to perform a function, such as piping, cable trays, conduit, or heating, ventilating, and air conditioning (HVAC). Components are items of equipment, such as pumps, valves, relays, or elements of a larger array, such as computer software, lengths of pipe, elbows, or reducers.

Field supervisor – This position is responsible for field coordination of daily activities within the ICDF Complex. The field supervisor reports directly to the ICDF Complex facility manager and works with him/her to ensure that day-to-day operations of the Complex are performed in accordance with regulations and procedures. Typical activities include conducting prejob briefings, conducting facility inspections, coordinating personnel, and maintaining the operational facility.

The following positions are direct reports to the ICDF field supervisor:

Process operator – This position is responsible for performing the day-to-day functions for facility operations. Examples of the responsibilities of this position are reading the process instrumentation to ensure the facility is operating within the design parameters, operating the truck loading/unloading facility at the evaporation pond, operating the stabilization unit, performing any required daily rounds and recording the results, scheduling maintenance activities, monitoring the water levels in the evaporation pond, and performing other operational duties to ensure that the facility is operated to protect the environment and human health and safety.

Radiological control technician – This position is responsible for providing radiation control technical support for the ICDF Complex. The RCT provides radiological oversight; ensures that radiological instruments are properly calibrated; characterizes facility and work-site radiological conditions; documents radiation monitoring and surveys; performs surveillance and assessments; and controls and directs radiological field work including evaluating and establishing radiation control boundaries within the ICDF Complex and the generating site.

Laborer – This position is responsible for supporting operations personnel in accordance with the existing labor/union agreements.

Crafts and maintenance – Maintenance work will be performed in accordance with this RAWP and INEEL maintenance procedures and other INEEL procedures related to proper identification of requirements, specification of materials/parts, and the control and handling of materials, once received and issued to the maintenance organization. Activities include both preventive/predictive maintenance and unscheduled maintenance requirements. Some of the crafts anticipated to be engaged in maintenance activities include instrument technicians, electricians, pipefitters, carpenters, mechanics, etc.

Lab technician – This position is responsible for performing, when requested, routine analytical/field testing on the waste streams associated with the ICDF. This may include, but is not limited to, verification sampling and routine ICDF Complex sampling.

Samplers – This position is responsible for performing routine sampling including collection, preservation, and delivery to the appropriate entity. This would include, but not be limited, to leachate sampling, LDRS sampling, LDRS and Primary Leak Detection and Recovery System (PLDRS) sampling, groundwater sampling, verification sampling, etc.

Equipment Operators – This position is responsible for operating the equipment being utilized at the ICDF Complex, e.g., backhoe operators, truck drivers, etc. Personnel filling these positions are trained and/or verified as having the required "skill of the craft" for performing their duties. INEEL personnel, or subcontractors, make work assignments in accordance with existing agreements or labor/union contracts.

2.3 ICDF Complex Personnel Training

Training is performed to provide information on ICDF hazards and associated controls, procedures, and requirements for access. Personnel working at the ICDF Complex will have the 40 hours Hazardous Waste Operations and Emergency Response (HAZWOPER) training as is required by CERCLA regulations. Additionally, ICDF operations personnel will be trained to meet the requirements of 40 CFR 264.16(a)(1)(c) and appropriate INEEL training requirements. All ICDF training is developed, conducted, and maintained in accordance with INEEL training procedures. These procedures describe the processes that ensure the INEEL workforce is properly trained to work effectively and safely. The detailed outline of this training is found in Table 6-1 of the HASP and is considered the minimum training per position (INEEL 2003).

The facility manager is responsible to ensure that personnel have an adequate level of facility knowledge, including a general overview of the facility, facility-specific hazards, safety, and applicable procedures. A thorough analysis of course work and other associated training required for certifications must complete the necessary qualifications and a formal continuing training program will be developed. Personnel requiring ICDF operations or position-specific qualifications or certifications complete the necessary training prior to initiating ICDF activities. The supervisor conducting prejob briefings will have the OSHA HAZWOPER supervisor course in addition to the other required training. As appropriate, a qualified instructor or subject matter expert conducts and documents in accordance with INEEL procedures.

Operational activities require a prejob briefing conducted by a supervisor or lead person. During this briefing, tasks associated with ICDF operations are outlined, hazards identified, hazard controls/mitigation reviewed, PPE requirements discussed, waste minimization opportunities communicated, and questions answered. Following the completion of operational activities, a postjob briefing may be conducted with particular emphasis on capturing lessons learned and process improvement for future operations.

Additional details for radiation worker training are included in Section 3.7 of the O&M Plan and details concerning other training requirements are included in INEEL (2003).

3. OPERATIONAL LIMITS AND ENVIRONMENTAL MONITORING

This section of the O&M Plan outlines operational limits that have been developed for the ICDF Complex, describes operational environmental monitoring/inspection or record/reporting requirements, and describes monitoring that will be performed. The contents of the main subsections are summarized below.

- Section 3.1, Waste Acceptance Criteria, describes the operational limits that were developed in the three ICDF Complex WAC documents.

- Section 3.2, IDAPA, describes the concentration guidelines and operational mass limits that have been modeled and established in "IDAPA Air Compliance Demonstration for the ICDF Complex" (EDF-2237). Operational mass limits based upon air emission and dispersion modeling will be used to schedule waste streams into the ICDF Complex to maximize operational flexibility while maintaining compliance with the appropriate IDAPA standards (IDAPA 58.01.01.585 and 586).

- Section 3.3, NESHAP, summarizes the modeling that was performed for the ICDF Complex previously and reasserts the operational goal of less than 1 mrem/yr that has been established for the ICDF Complex. Annual calculations will be performed to calculate the NESHAP contribution from the ICDF Complex for inclusion in the INEEL annual NESHAP report. The method for completing these calculations is presented in "NESHAP Compliance Demonstration for the ICDF Complex" (EDF-2236).

- Section 3.4, Ecological Risk, summarizes the analysis that was previously performed in the Screening Level Ecological Risk Assessment (SLERA) (EDF-ER-311) and provides monitoring data needs for evaporation pond water and sediments.

- Section 3.5, Short-Term Risk, summarizes the results of a short-term risk assessment for workers and public receptors associated with the ICDF Complex (EDF-ER-327). The risk assessment evaluated exposure to ICDF Complex operators and the public for modeled concentrations of radioactive and nonradioactive hazardous substances representative of the ICDF landfill, the evaporation pond, and the decon building. The assessment also considers the exposure to the landfill and evaporation pond WAC concentration guidelines as a method to assist in determining a bounding limit for a proposed visitor.

- Section 3.6, Groundwater, provides a summary of the groundwater remedial action objectives (RAOs) established for the ICDF Complex in the OU 3-13 ROD (DOE-ID 1999), describes how RAOs were modeled in the various components of the ICDF Complex design, and refers to other sections or documents that describe how groundwater RAOs will be demonstrated for the ICDF Complex.

- Section 3.7, Radiological Controls, describes the radiological controls program that has been developed at the INEEL and will be implemented during operation of the ICDF Complex.

- Section 3.8, Action Leakage Rate, provides a summary of the action leakage rates (ALRs) that have been calculated for the ICDF landfill and evaporation pond. A discussion is provided regarding the comparison of the ALRs to actual sump flow rate data.

- Section 3.9, Environmental Monitoring and Recordkeeping, provides a summary table of all ICDF Complex operational applicable or relevant and appropriate requirements (ARARs) that have monitoring, inspection, report, or recordkeeping requirements. This section also summarizes the environmental monitoring, including groundwater monitoring, waste verification sampling, treated waste sampling, and O&M sampling at the ICDF Complex, that will be performed as part of the ICDF Complex operations. This section refers to the appropriate documents for additional details about the monitoring program for a particular media or data need.

- Section 3.10, Sampling and Analysis/Sampling Quality Assurance, summarizes the sampling plans that have been developed and will be implemented during ICDF Complex operations. QA for the data collected in accordance with the sampling plans is also presented.

3.1 Waste Acceptance Criteria

The WAC documents developed and established as part of the SSSTF Remedial Design/Construction Work Plan (CWP) (DOE-ID 2002d) and the ICDF RD/CWP (DOE-ID 2002b) include the following:

- ICDF Complex WAC (DOE-ID 2002e)
- ICDF landfill WAC (DOE-ID 2002a)
- ICDF evaporation pond WAC (DOE-ID 2002c).

Based upon limits established in the WAC documents (DOE-ID 2002e, DOE-ID 2002a, and DOE-ID 2002c), 40 CFR 264 Subpart BB and 40 CFR 264 Subpart CC do not apply to the operations of the ICDF Complex. This is based upon the WAC limiting the organic concentrations in wastes to less than 10% by weight; this limit is an exception to 40 CFR 264 Subpart BB per 40 CFR 264.1050(b). Additionally, the WAC documents limit the volatile organic concentration to less than 500 ppm by weight; this limit is an exemption from 40 CFR 264 Subpart CC per 40 CFR 264.1082(c)(1).

3.1.1 ICDF Complex Waste Acceptance Criteria

The ICDF Complex WAC document provides the basis for the types and quantities of wastes allowable for receipt, staging, storage, sizing, and treatment at the ICDF Complex, provides packaging and radiological criteria, and sets the criteria for waste to be treated at the treatment unit. Implementation of the ICDF Complex WAC will ensure compliance with the OU 3-13 ROD (DOE-ID 1999) and provide protection of human health and the environment, including the SRPA.

3.1.2 ICDF Landfill Waste Acceptance Criteria

The ICDF landfill WAC document specifies the chemical and radiological WAC for wastes that will be disposed in the landfill. The landfill WAC document is a critical component of the entire ICDF design. The WAC have been developed based on modeling assumptions so that wastes placed in the ICDF landfill will not cause groundwater in the SRPA to exceed either maximum contaminant levels, a hazard index (HI) of 1, or 10^{-4} cumulative risk levels, which are defined as RAOs in the OU 3-13 ROD (DOE-ID 1999). Modeling to support the WAC development was documented in "Fate and Transport Modeling Results and Summary Report" (EDF-ER-275). Compliance with the requirements of the landfill WAC will ensure protection of human health and the environment, including the SRPA.

In addition, projected chemical and radiological concentrations of landfill leachate were compared with published manufacturer's compatibility data and other project testing to ensure wastes placed in the landfill would not damage either the natural or synthetic components of the landfill liner system. The results of this comparison are presented in "Liner/Leachate Compatibility Study" (EDF-ER-278) and also provided in Appendix B of the ICDF landfill WAC document (DOE-ID 2002a).

Finally, the landfill WAC were also established by looking at other regulatory requirements, including ARARs for the ICDF landfill. Examples of these requirements include, but are not limited to, the following:

- Wastes cannot exceed 10 nCi/g total transuranic isotopes
- Wastes cannot be greater than Class C as defined by 10 CFR 61
- Total volatile organics in the evaporation pond cannot exceed 500 ppm by weight, which limits the waste concentrations in the landfill so that leachate concentrations do not exceed the requirement
- Total PCBs cannot exceed 500 mg/kg
- Wastes from WAGs other than WAG 3 must meet LDRs.

The ICDF landfill WAC (document) provides guidance for tracking wastes that enter the ICDF Complex for ultimate disposal to the landfill to determine what percentage of the WAC limit has been used to date (DOE-ID 2002a):

1. Each waste load or container will have a Container Profile identifying the substances and concentrations contained in the waste. This Container Profile may be the same as the Material Profile, but will not exceed the concentrations in the Material Profile.
2. The mass of each constituent placed in the landfill will be calculated for each waste load or container using the information from the Container Profile (weight × concentration for each constituent).
3. A database or spreadsheet will be kept identifying each constituent and the cumulative mass of each constituent placed in the landfill. The Waste Tracking Plan for the ICDF Complex describes the tracking process in more detail (PLN-914).
4. A running inventory will be maintained of the total mass of each constituent received at the facility. The total mass received for each substance will be compared to the total mass limit of the substance identified in the WAC. This comparison for each substance will provide an indication of how much of the WAC limit has been used by the actual substances in the waste. In addition, average concentrations of the constituents in each container or waste load will be checked against concentration-based criteria.

It is important to note that although concentration guidelines for waste acceptance are provided in the ICDF landfill WAC, the operational limit is actually the total contaminant mass or activity, unless other operational concentration-based limits (established elsewhere in Section 3 of this O&M Plan) are provided. The concentration guidelines are provided in the ICDF landfill WAC for the ease of the ICDF Complex user in determining whether a particular waste stream may be acceptable.

3.1.3 ICDF Evaporation Pond Waste Acceptance Criteria

The ICDF evaporation pond WAC document was developed to provide the basis for the limiting concentrations of radioactive and nonradioactive contaminants in the ICDF evaporation pond. The aqueous wastes will include leachate from the ICDF landfill, WAG 3 purge and development water from monitoring well drilling operations, and secondary aqueous wastes generated as a result the ICDF

Complex operations. Compliance with the requirements of the ICDF evaporation pond WAC will ensure protection of human health and the environment.

The ICDF evaporation pond WAC were developed in a similar fashion to the ICDF landfill WAC by evaluating liner compatibility concentrations and other regulatory requirements (ARARs) that provided a concentration limit for the aqueous wastes disposed to the pond. Groundwater RAOs were not evaluated for the evaporation pond WAC because the analysis performed for the ICDF landfill WAC would also be protective for the evaporation pond. The comparison performed to determine the limiting concentration for the evaporation pond is presented in Appendix B of the evaporation pond WAC document (DOE-ID 2002c).

To evaluate liner compatibility, chemical and radiological concentrations of leachate were compared with published manufacturer's compatibility data and other project testing to ensure wastes placed in the evaporation pond would not damage either the natural or synthetic components of the evaporation pond liner system. The results of this comparison are presented in "Liner/Leachate Compatibility Study" (EDF-ER-278).

The evaporation pond WAC were also established by looking at other regulatory requirements that are ARARs. Examples of these requirements include, but are not limited to, the following:

- Aqueous wastes generated from groundwater monitoring activities other than WAG 3 or ICDF Complex groundwater monitoring activities are prohibited from disposal in the ICDF evaporation pond.

- Other aqueous waste streams not associated with operation of the ICDF Complex are prohibited from disposal in the ICDF evaporation pond.

- Waste containing greater than 10 nCi/g as expressed in liquid units (10 nCi/mL or 1E+07 pCi/L) of transuranic (TRU) radionuclides is prohibited from disposal at the ICDF evaporation pond.

- Direct disposal of PCB wastes is prohibited. Although unlikely, PCBs may be a component of the ICDF leachate. As a CAMU for the ICDF leachate, the evaporation pond may accept FO39 (landfill leachate) waste.

- Hazardous waste with greater than 500 ppm volatile organic compounds (VOCs) is prohibited.

- Hazardous waste with organic concentrations greater than 10% by weight is prohibited.

- Waste containing greater than 1% chelating compounds by weight is prohibited.

- Spent nuclear fuel and high-level waste are prohibited.

3.2 IDAPA

Ambient air standards for the Idaho Department of Environmental Quality (IDEQ) are administered by IDAPA 58.01.01, "Rules for the Control of Air Pollution in Idaho." ARARs for the ICDF Complex are tabulated in IDAPA Section 58.01.01.585, "Toxic Air Pollutants Non-Carcinogenic Increments," and IDAPA Section 58.01.01.586, "Toxic Air Pollutants Carcinogenic Increments[c]."

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c. As promulgated in December 1999.

Air emission and dispersion modeling was performed to develop ICDF Complex waste concentration guidelines and operational mass limits that maximize operational flexibility and meet IDAPA standards (IDAPA 58.01.01.585 and 58.01.01.586). Facilities in the ICDF Complex modeling included the treatment unit, landfill, and evaporation pond. Modeling assumptions, methodology, input parameters, and results of the analysis are included in "IDAPA Air Compliance Demonstration for the ICDF Complex" (EDF-2237).

For the modeling, a list of constituents was prepared that included only those substances with values listed in both the design inventory (EDF-ER-264) and IDAPA 58.01.01.585 and 58.01.01.586. Two computer models were used to develop the concentration guidelines: *WATER9* (TTN 2002) for modeling of emission rates for volatiles and semivolatiles and *ISCST3* (EPA 1995a) for dispersion modeling of volatiles, semivolatiles, and nonvolatiles as particulate.

The modeling effort used an iterative process based on an assumed initial concentration and a list of required input parameters for each model. The initial concentration was modified upward or downward depending upon the results of the subsequent modeling. The *WATER9* model was run for the volatile and semivolatile constituents, with the resulting modeled emission rates used as inputs to the *ISCST3* dispersion model. Nonvolatiles were modeled directly using *ISCST3*. This iterative process was continued until a modeled concentration of approximately 95% of the IDAPA-listed concentration was achieved. These modeled concentrations established the waste concentration guidelines required to meet the IDAPA limits.

The modeling resulted in a particulate-based concentration guideline for the ICDF landfill, a volatilization-based concentration guideline for the landfill, and a volatilization-based concentration guideline for the ICDF evaporation pond. The smaller of the landfill concentration guidelines was carried forward for further analysis, as was the evaporation pond concentration guideline. These modeled concentration guidelines were then compared with the respective WAC guideline concentrations (DOE-ID 2002a; 2002c) for each constituent. Modeled concentration guidelines were considered to be within WAC guidelines for a given constituent if the modeled value was greater than the WAC guidelines.

Mass-based operating limits were calculated using the emission-based concentration guidelines and the loading rates for the landfill and evaporation pond. In some cases, the emission-based concentration guidelines were below the WAC-guideline concentrations. Two limits are specified–24-hour maximum and annual average–to reflect the IDAPA air toxic regulations for noncarcinogens (24-hour standards) and carcinogens (annual standards), respectively. A complete listing of the mass-based operating limits is included in EDF-2237.

Table 3-1 lists those constituents with modeled concentration guidelines below their corresponding WAC guideline concentrations. Included in this table are the WAC guidelines, modeled concentration guidelines, and the final annual and 24-hour operating limits. Operating limits for all modeled constituents are included in EDF-2237.

For constituents that were operationally limited for a single facility (e.g., either the landfill or the evaporation pond), the input concentrations for the ICDF landfill and ICDF evaporation pond were adjusted and remodeled to balance the loading between the facilities, in order to eliminate operationally limited conditions where possible.

Table 3-1. Summary of IDAPA emission-based operating limits for operationally limited constituents.

Compound (CAS No.)	WAC Guideline Concentrations		Guideline Concentrations[c]		Mass-Based Operational Limits	
	Landfill[a] (mg/kg)	Evaporation Pond[b] (mg/L)	Landfill (mg/kg)	Evaporation Pond (mg/L)	Landfill[d] (kg/day)	Evaporation Pond[e] (kg/day)
Carcinogens (Annual Limit)						
Benzidine (92-87-5)	1.72E+01	1.00E+04	1.72E+01	3.88E+03	9.92E+00	5.74E+00
Benzo(a)pyrene (50-32-8)	1.05E+02	2.00E+03	1.05E+02	3.11E+02	6.06E+01	4.60E-01
Hexachlorobenzene (118-74-1)	1.14E+01	No limit	8.25E+00	6.00E-02	4.76E+00	8.88E-05
Hexachlorobutadiene (87-68-3)	2.07E+01	No limit	2.07E+01	4.86E+04	1.19E+01	7.19E+01
Noncarcinogens (Annual Limit)						
Ethyl cyanide (as Cn – cyanide) (592-01-8)	3.31E+04	1.00E+04	4.14E+03	6.90E+04	2.39E+03	1.02E+02
Hexachlorocyclopentadiene (77-47-4)	1.14E+01	No limit	1.14E+01	2.15E+04	6.58E+00	3.18E+01
Mercury (7439-97-6)	9.45E+03	5.00E+05	1.28E+02	6.75E+02	7.40E+01	9.99E-01
Naphthalene (91-20-3)	4.25E+02	No limit	4.25E+02	1.00E+06	2.45E+02	1.48E + 03
Noncarcinogens (24-Hour Maximum Limit)						
Ethyl cyanide (as Cn - cyanide) (592-01-8)	3.31E+04	1.00E+04	2.50E+03	4.17E+04	3.66E+03	6.17E+01
Hexachlorocyclopentadiene (77-47-4)	1.14E+01	No limit	3.42E+02	6.84E-01	5.00E+02	1.01E-03
Mercury (7439-97-6)	9.45E+03	5.00E+05	7.74E+01	4.07E+02	1.13E+02	6.02E-01
Naphthalene (91-20-3)	4.25E+02	No limit	1.10E+05	2.17E+04	1.61E+05	3.21E + 01

Note: A complete list of operating limits for all IDAPA-listed constituents is included in EDF-2237.

a. Taken from the landfill WAC (DOE-ID 2002a).

b. Taken from the evaporation pond WAC (DOE-ID 2002c).

c. Values shown have landfill concentrations set at the WAC guideline concentrations. The evaporation pond concentrations have been maximized but are still below WAC guideline concentrations.

d. These values were calculated using the annual (or 24-hour) concentration guidelines (mg/kg) × (1500 kg/m^3) × (503 yd^3/day) × (0.7646 m^3/yd^3)/(1E+06 mg/kg).

e. Mass-based operational limits are based on an annual (or 24-hour) average daily leachate rate of 391 gal/day. These concentrations were calculated using the annual (or 24-hour) concentration guidelines (mg/L) × (391 gal/day) × (3.785 L/gal) / (1E+06 mg/kg).

Where the constituent had WAC-based limits for both facilities (e.g., 1,1-dichloroethene), both WAC limits were used as the initial basis for the load-balancing emissions model to demonstrate compliance with the IDAPA standards. In cases where no ICDF evaporation pond WAC guideline was specified (e.g., hexachlorobutadiene), the ICDF landfill WAC limit was used as the initial set value for the load-balancing emission modeling, with the ICDF evaporation pond concentration guideline adjusted accordingly to meet the IDAPA standards.

Controls and tracking requirements for WAC-limited constituents are discussed in the respective facility WAC document (DOE-ID 2002a; 2002c). Modeled operational limits below WAC values indicate that additional waste tracking and/or operational controls may be required, in accordance with the Waste Tracking Plan (PLN-914).

Operational controls may be required for benzidine, benzo(a)pyrene, hexachlorobenzene, hexachlorobutadiene, ethyl cyanide (as cyanide), hexachlorocyclopentadiene, mercury, and naphthalene, which are operationally limited for the landfill and/or evaporation pond based on a comparison of modeled-concentration guidelines to WAC guidelines. Operational controls may be required to ensure that the mass-based operational limits are not exceeded. Operational controls will include, but are not limited to, storage or staging of waste, staggering of loads transported to the ICDF landfill over time, increased soil coverage for loads with operationally limited constituents, treatment of soils (e.g., grouting), and other types of controls evaluated on a case-by-case basis.

3.3 NESHAP

NESHAP are published in the *Code of Federal Regulations* at 40 CFR 61. The relevant standard for the ICDF Complex operations is "Subpart H–National Emission Standards for Emissions of Radionuclides other than Radon from Department of Energy Facilities" (40 CFR 61, Subpart H). The regulation states

> Emissions of radionuclides to the ambient air from Department of Energy facilities shall not exceed those amounts that would cause any member of the public to receive in any year an effective dose equivalent of 10 mrem/yr.

Radionuclides are contained in the CERCLA remediation wastes destined for the ICDF Complex. Activities associated with the collection, handling, and disposal of these wastes are anticipated to release low amounts of radionuclides into the ambient air. Potential NESHAP emissions from the ICDF Complex operations (EDF-ER-290) were estimated and the emission estimates were modeled to show the impact to the nearest public receptor. The results of the analyses show the ICDF Complex operations will have an impact of less than 0.05 mrem/yr, below the NESHAP standard of 10 mrem/yr.

Compliance with the NESHAP standard will be evaluated on an annual basis in conjunction with INEEL on a site-wide basis. The ICDF Complex will not contribute enough emissions to the Site–wide release total that would cause an exceedence of the standard. To ensure that the ICDF Complex is not a major factor in changing the INEEL NESHAP status, an operation goal for the Complex will be set at less than 1 mrem/yr. This will be met through operational constraints as outlined in the ICDF Complex WAC document (DOE-ID 2002e). The emissions from the ICDF Complex will be calculated on an annual basis, as described in "NESHAP Compliance Demonstration for the ICDF Complex" (EDF-2236) and included in the INEEL annual NESHAP report. If the operational goal of 1 mrem/yr is exceeded, the Agencies will be notified.

EDF-2236 uses EPA's "Compilation of Air Pollutant Emission Factors," AP-42 (EPA 1995b) to estimate NESHAP emissions from the following ICDF Complex-related activities:

- Digging contaminated soil

- Loading contaminated soil
- Unloading contaminated soil
- Landfill operations
- Evaporation pond
- Decon building operations.

For each of these activities, a final weight (pounds) of total suspended particles is determined, which would be used for the necessary NESHAP calculations.

3.4 Ecological Risk

A SLERA was performed and is presented in EDF-ER-311. The approach of the assessment was to evaluate the landfill soil for exposure to terrestrial receptors and to evaluate the evaporation pond for both terrestrial (drinking water) and aquatic receptors. The assessment approach summarized below was used to evaluate WAC and to direct and focus monitoring to be performed at the ICDF Complex.

3.4.1 Summary of Ecological Risk Assessment

The SLERA (EDF-ER-311) was based on modeled contamination levels in the soil and leachate in the evaporation pond and for the ICDF Complex during its operational period. Methods were very conservative, as were the modeled inventories. The concentrations used in this SLERA were from the Design Inventory (EDF-ER-264) and/or the CERCLA Waste Inventory Database (CWID) Report (DOE-ID 2000).

The exposure parameters used in the assessment were adapted to better represent the conceptual site model for the ICDF Complex. For the landfill site, the exposure duration for each species was reduced to more realistically reflect the individual receptor's potential use of the site. Conversely, the presence of water in the evaporation pond and other related structures (buildings, etc.) is expected to encourage use by selected species. As discussed in EDF-ER-311, the ingestion of water was evaluated in conjunction with the exposure evaluated at the landfill. For all contaminants, the maximum concentration anticipated to be in the surface water was evaluated. It is expected that this will overestimate the exposure because contaminants of potential concern (COPCs) and radiological COPCs in the pond should go to equilibrium with the sediment reducing the concentrations.

Both terrestrial and aquatic receptors were assessed. However, aquatic organisms, such as fish and other benthic organisms, were not assessed, as this facility is not considered a natural water body. When evaporation pond operations are discontinued, the pond will be eliminated as a source of drinking water for those species present at the INEEL. The deer mouse, mule deer, coyote, Townsend's western big-eared bat, mourning dove, sage grouse, red-tailed hawk, and bald eagle were selected as terrestrial receptors. The mallard duck and spotted sandpiper are included as aquatic receptors for assessment at the ICDF evaporation pond. These species, although modeled as having a limited use of the facility, are the risk drivers due to the exposure from aquatic sources.

For radiological COPCs, DOE Headquarters has recently developed frameworks, methods, and guidance for demonstrating protection of the environment from the effects of ionizing radiation. The proposed standard is called *A Graded Approach for Evaluating Radiation Doses to Aquatic and Terrestrial Biota* (DOE 2002), and is approved by EH-4 for interim use by DOE program and field elements in evaluating doses to biota. This technical standard provides dose evaluation methods that can be used to meet protectiveness requirements.

The DOE standard provides a general screening concentration that allows the evaluation of radionuclides in water, co-located sediments, and soils for both the aquatic and terrestrial system. This standard is used for those radiological COPCs that have both leachate and soil concentration. It is well accepted that sediment and water contaminant concentrations will come to equilibrium within a system. For this analysis, calculating a sediment concentration from the water is not appropriate, as this will be the leachate concentration estimated over 15 years of operation. Therefore, for this assessment, the water concentration summed over all years of operation is considered conservative of the dose that receptors using the pond would receive. Generic biotic concentration guides (BCGs) are used within each system. A sum of fractions approach was used in comparing radionuclide concentrations in environmental media with the BCGs contained in the standard lookup tables. None of the three radionuclides detected in both the leachate and soil exceeds the standards criteria.

As discussed in the SLERA (EDF-ER-311), hazard quotients (HQs) and HIs were primarily used to assess risk. In summary, the results indicate that Kr-85 was the only radionuclide with HQs greater than or equal to 1.0 for internal exposure. This radionuclide is a chemically inert gas that was conservatively assumed to be present in the inventory. However, it is highly unlikely that it will be present in the soil at the concentrations modeled due to its volatility. Additionally, Kr-85 has no concentration factor for feed to tissue uptake to develop a realistic exposure assessment, because it is a gas and would mainly present an inhalation risk. Also, the half-life for this radionuclide is 10.8 years and it is not anticipated to remain at the concentrations modeled throughout the lifetime of the ICDF Complex. Based on this rationale, it was eliminated as a concern and is considered to present minimal risk.

Concentrations in the evaporation pond were compared to acceptable concentrations. This comparison indicates that sulfate and vanadium concentrations in the evaporation ponds could potentially reach concentration levels of concern to ecological receptors.

The SLERA also presents a qualitative discussion of risk to receptors of special concern (EDF-ER-311). It indicates that of the INEEL sensitive bird species, the burrowing owl and bald eagle were rarely sighted at the wastewater ponds in the INTEC area and that exposure to other species should be limited. The Cieminski (1993) study indicated that there was no apparent relationship between the number of small mammals captured and the distance of the trap from the pond. The pygmy rabbit and Townsend's western big-eared bat were not sighted at wastewater ponds. The sagebrush lizard has been sighted in the area. However, the quality of the habitat is spotty. The disturbance in the area surrounding the ICDF Complex should significantly reduce any use of this area. Sagebrush lizard prefer rock outcrops (which do not exist in the area) and would be found in the undisturbed sagebrush areas along the north and west side of the INTEC facility (DOE-ID 2001).

3.4.2 Acceptable Concentrations of Water in Evaporation Pond

Acceptable concentration levels for water in the evaporation pond can be based on acceptable leachate concentrations (ALCs). ALCs for use at the ICDF Complex were developed for those COPCs identified in "Leachate/Contaminant Reduction Time Study" (EDF-ER-274). The proposed standard *A Graded Approach for Evaluating Radiation Doses to Aquatic and Terrestrial Biota* (DOE 2002) was used to provide ALCs for radionuclide COPCs. Table 3-2 presents the initial values considered acceptable in each media for the radionuclide contaminants of concern.

Table 3-2. Acceptable media concentrations for selected radionuclides.

	Aquatic Receptors		Terrestrial Receptors	
Radionuclide	BCG (water) (pCi/L)	BCG (sediment) (pCi/g)	BCG (water) (pCi/L)	BCG (soil) (pCi/g)
I-129	2.7E + 04	NA	5.4E + 06	6.E + 03
Tc-99	5.40E + 05	NA	3.42E + 06	4.E + 03
U-238	2.16E + 02	NA	5.4E + 05	2.E + 03

For nonradiological COPCs, the SLERA (EDF-ER-311) assessed the mallard and spotted sandpiper for the development of ALCs. The rationale and development of the ALCs are presented in Appendix A of the SLERA (EDF-ER-311).

The ALCs presented in Table 3-3 can be used to determine if the concentrations of contaminants in the evaporation pond are within an acceptable level. Ambient water quality is considered protective of 95% of aquatic receptors (including fish and other benthic organisms) in a natural water body. Ambient water quality criteria would be too conservative for the evaporation pond, however, since it is not considered a natural water body. After the ICDF mission is accomplished, the pond will be eliminated as a source of drinking water for those species present at the INEEL. However, the evaporation pond will be used by both waterfowl and terrestrial receptors as a water source. The ALCs were developed to be protective of both terrestrial and aquatic receptors. This includes the deer mouse, mule deer, coyote, Townsend's western big-eared bat, mourning dove, sage grouse, red-tailed hawk, and bald eagle as terrestrial receptors and the mallard duck and spotted sandpiper as aquatic receptors. A concentration of a contaminant in the evaporation pond below either the ALC or ambient water quality criteria would be considered protective of ecological receptors.

3.4.3 Monitoring Recommendations for Ecological Receptors

As a management practice, soil fixative or clean soil will be used on the landfill waste surface prior to winter shutdown to control dust and erosion. Additional information about the soil fixative and its application is provided in Appendix A of this O&M Plan. This soil fixative or clean soil should limit exposure of the contaminated soil to ecological receptors to acceptable levels based on the results of the SLERA (EDF-ER-311). Plants were not assessed in this ecological risk assessment because it was assumed all vegetation growth within the waste disposal areas will be hindered during the operational period. Specifically, during operation of the landfill, the area where deposition of contaminated soil is occurring will be kept clear of vegetation. Although erosion control will be maintained using plants, the areas vegetated will be on the sides of the landfill and should not have contact with contaminated soil. Post-operationally, the ICDF landfill will be capped with a robust cover with a middle section designed to eliminate biointrusion (burrowing animals and root intrusion).

The pond will be built with bare, steep shorelines and conditions will be maintained to limit nutrient enrichment and vegetation. The Cieminski (1993) study evaluated pond characteristics that were more or less favorable to wildlife. Table 3-4 lists the characteristics to be considered in management of wastewater ponds, in order of importance.

Table 3-3. Acceptable contaminant concentrations for use at the ICDF evaporation pond.[a]

COPC	Fraction of Total Water Body Concentration in Water Column (unitless)	Fraction of Total Water Body Concentration in Benthic Sediment (unitless)	ALC (mg/L)	Modeled Concentrations (mg/L)	Ambient Water Criteria (ug/L)	Sediment Quality Criteria (ppb dry weight)
Arsenic	6.43E - 01	3.57E - 01	6	1.53	340	5,900
Boron	—	—	—[b]	40.7	—	—
Calcium	—	—	—[c]	4.86	—	—
Chlorine	—	—	—[d]	16.6	19	—
Magnesium	—	—	—[c]	0.25	—	—
Phosphorus	—	—	—[e]	6.8	—	—
Potassium	—	—	—[c]	0.089	—	—
Selenium	9.05E - 01	9.50E - 02	0.07	0.073	5.0 (13 - 186)	290
Sulfur	—	—	—[d,e]	373	—	—
Vanadium	5.11E - 02	9.49E - 01	3	3.48	—	50,000
Zinc	4.60E - 01	5.40E - 01	8	0.031	120	123,100

a. Concentrations below ALCs or ambient water quality criteria will be protective of ecological receptors using the evaporation pond.

b. Boron toxicity and ambient water quality criteria are lacking. See the discussion in Section A-1 of EDF-ER-311.

c. Toxicity reference values are not available to establish an ALC for calcium, magnesium, or potassium. However, these COPCs are essential nutrients, and are not considered toxic except under extremely high concentrations (10 × background).

d. As a soil-water partition coefficient (Kd) value was not available for chlorine or sulfur, an ALC could not be calculated.

e. Toxicity reference values were not available for establishing ALCs for phosphorus or sulfur.

NOTE: — = no information available or no value calculated.

Table 3-4. Pond characteristics to discourage or encourage wildlife use of constructed ponds, listed in order of importance (Cieminski 1993).

Characteristic	Effect on Wildlife Use: Discourage	Effect on Wildlife Use: Encourage
Surface area	Minimize	Maximize
Invertebrates	Minimize	Maximize
Shrub cover	None	Maximize
Bare shoreline	(species dependent)[a]	
Shoreline slope	Steep	Low
Shoreline length	Minimize	Maximize
Emergent vegetation	No	Yes
Fencing	Yes	No
Height of berms	High	Low
Length orientation	NW-SE	SW-NE

a. Bare shoreline discourages use by ruddy ducks, American coots, Brewer's sparrows, white-crowned sparrows, and chipping sparrows, and encourages use by spotted sandpipers, Wilson's phalaropes, western sandpipers, and Brewer's blackbirds.

During the field season of 2003, an evaluation of the baseline population will be performed. This will include an evaluation of the small mammals, birds, and reptile use of the current facility area.

Characterization of contaminant concentrations in water and sediment will be performed using the standard sampling methodology (lower detection limits for ecological receptors than the standard Contract Laboratory Program [CLP] method will be identified). From these results and the assessment of use by biota in the area, risk assessment results from the permitting process can be verified. However, it is important to note that the use of concentration data from co-located surface water and sediment samples is preferred and will result in a less conservative, more realistic evaluation.

3.5 Short-Term Risk

A short-term risk assessment for workers and public receptors associated with the ICDF Complex is presented in Appendix E (EDF-ER-327) per the National Oil and Hazardous Substances Pollution Contingency Plan, commonly referred to as the National Contingency Plan (40 CFR 300). The risk assessment considers exposure to ICDF Complex operators and the public to modeled concentrations of radioactive and nonradioactive hazardous substances representative of the ICDF landfill, the evaporation pond (with two cells), and the decon building. The assessment also considers the exposure to the landfill WAC concentration guides as a method to assist in determining a bounding risk for the proposed visitor. The time period bounding the risk assessment is the operational life of the ICDF Complex. This assumes a 15-year design life of the landfill disposal cell and decon building, and a total of 45 years for the evaporation pond. The latter period includes the 15-year operational period, plus an additional 30 years of ICDF postclosure operation to handle any leachate that may be generated following final cover of the landfill.

The risk assessment includes a range of exposure scenarios that capture various receptors associated with the ICDF Complex. Included are five Radiation Worker II exposure scenarios, four exposure scenarios for the general employee radiation training worker, two entry exposure scenarios for a member of the public, and one general public exposure scenario, as shown in Figure 3-1.

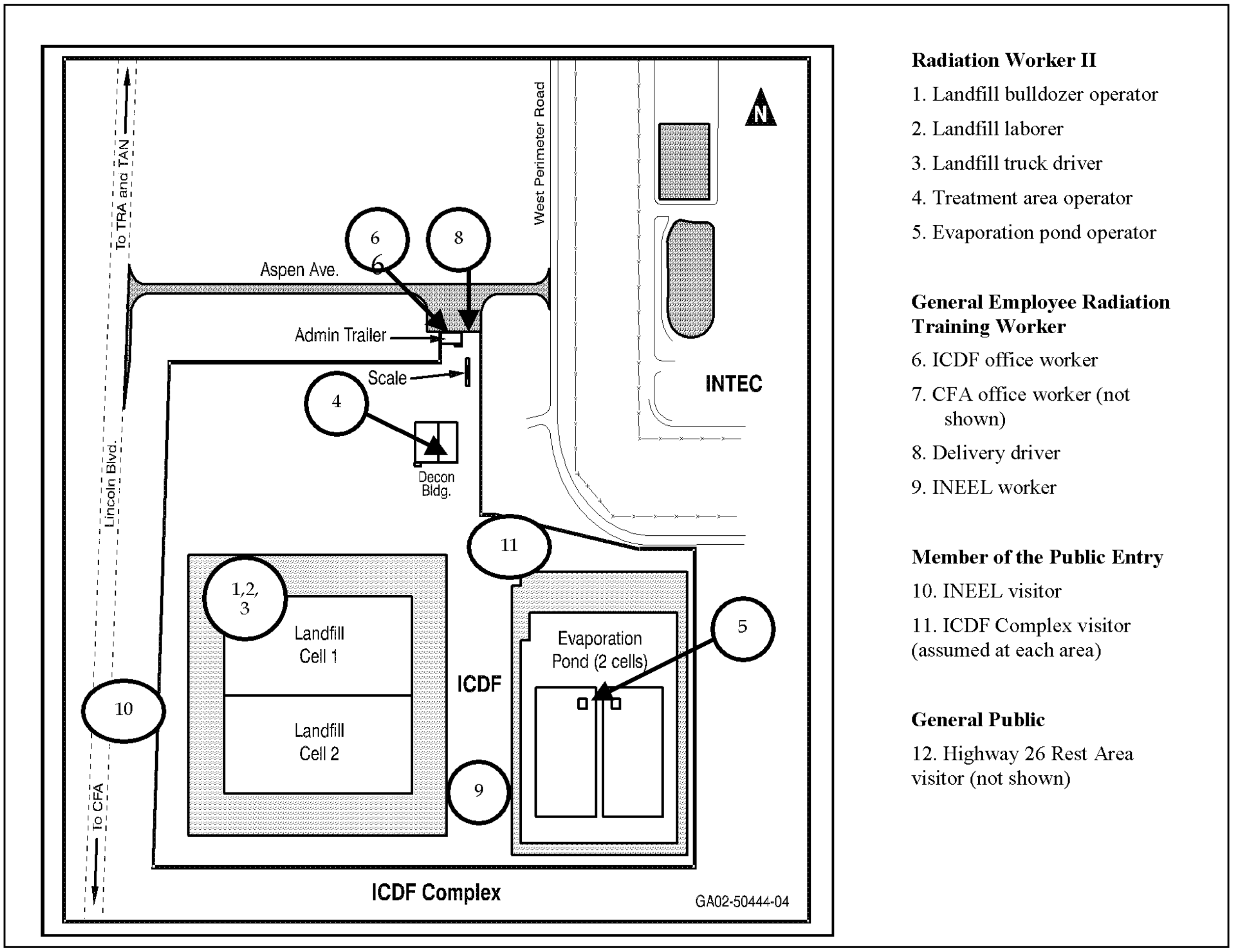

Figure 3-1. ICDF Complex exposure scenario, exposed individual locations.

The results of the radiological and nonradiological risk evaluations for the various exposure scenarios and associated groups are discussed further in the following sections. It should be noted that as low as reasonably achievable (ALARA) and standard health and safety practices will be used to ensure target risk levels are not exceeded. All exposure scenarios are within the acceptable target risk levels with the exception of the following three ICDF Complex operator exposure scenarios:

- Landfill laborer: 15 rem/yr exceeds the target risk level of 5 rem/yr
- Landfill truck driver: 6.6 rem/yr exceeds the target risk level of 5 rem/yr
- Evaporation pond operator: HI of 4 exceeds the target risk level of an HI of 1
- ICDF Complex visitor: 0.044 rem/yr exceeds the target risk level of 0.015 rem/yr.

The ICDF Complex operators and other INEEL employees will maintain personnel exposures ALARA based on INEEL contractor safety and RadCon management practices (see Section 3.7). Additional monitoring or operational limits are not required above and beyond those defined for the WAC.

3.5.1 Summary of Risk Estimates for Radiation Worker (II) Exposure Scenarios

A summary of the total effective dose equivalents (TEDEs) for radiation exposures, noncancer HI, and cancer (excess lifetime cancer risk [ELCR]) risk estimates for nonradiation exposures are presented in Table 3-5 for each of the identified radiation worker exposure scenarios.

Table 3-5. Summary of TEDE and risk estimates for radiation worker exposure scenarios.

	Radiation	Nonradiation	
Exposure Scenario	TEDE (rem/yr)	Noncancer HI	ELCR
Landfill bulldozer operator	4.4 E + 00	4.0 E - 01	8.0 E - 06
Landfill laborer	1.5 E + 01	4.0 E - 01	8.0 E - 06
Landfill truck driver	6.6 E + 00	4.0 E - 01	8.0 E - 06
Treatment area operator	3.6 E - 02	9.0 E - 01	1.0 E - 05
Evaporation pond operator	1.9 E - 02	4.0 E + 00	1.0 E - 07
Target risk levels	5.0 E + 00	1.0 E + 00	1.0 E - 04

With the exception of the landfill laborer and truck driver, the TEDEs for each receptor evaluated under the radiation worker exposure scenarios are less than the maximum radiation dose limit of 5 rem/yr. The TEDE for the landfill laborer and truck driver exceeds the radiation dose limit of 5 rem/yr.

It is important to note that the TEDE values calculated for the landfill laborer are based on unmitigated risk. In no event will radiation workers be allowed to exceed the regulatory limit of 5 rem/year for occupational exposures. Section 6.0 of EDF-ER-327 summarizes the approach for mitigating risk at the INEEL to administrative levels as far below the regulatory limits as reasonably achievable.

The potential cumulative ELCR from nonradiological carcinogenic COPCs is less than the target risk level of 1×10^{-4}. With the exception of the evaporation pond operator, the potential HI for noncancer effects is less than or equal to 1 for all ICDF Complex exposure scenarios. The HI for noncancer effects for the evaporation pond operator is 4; the primary contributors to noncancer risk are 2-nitroaniline, 3-nitroaniline, and 4-nitroaniline. The project HASP adequately addresses mitigation measures associated with these constituents (INEEL 2003).

3.5.2 Summary of Risk Estimates for General Employee Radiation Training Worker Exposure Scenarios

A summary of the TEDE for radiation exposures, noncancer HI, and ELCR risk estimates for general employee radiation training worker exposures is presented in Table 3-6 for each of the identified exposure scenarios.

Table 3-6. Summary of TEDE and risk estimates for nonradiation worker exposure scenarios.

	Radiation	Nonradiation	
Exposure Scenario	TEDE (rem/yr)	Noncancer HI	ELCR
ICDF office worker	<1.0 E - 03	<1.0 E – 02	5.0 E - 09
Central Facilities Area (CFA) office worker	<1.0 E - 03	<1.0 E – 02	3.0 E - 12
Delivery driver	<1.0 E - 03	<1.0 E – 02	4.0 E - 09
INEEL worker (power line management)	8.0 E - 03	2.0 E – 02	3.0 E - 07
Target levels	1.0 E - 01	1.0 E + 00	1.0 E - 04

The TEDE for the nonradiation worker scenarios is less than the radiation dose limit of 0.1 rem/yr. It is important to note that the TEDE values calculated for the nonradiation worker exposure scenarios are based on unmitigated risk. In no event will site workers be allowed to exceed the regulatory limit of 0.1 rem/yr for occupational exposures. Section 6.0 of EDF-ER-327 summarizes the approach for mitigating radiation risk at the INEEL to administrative levels as far below the regulatory limits as reasonably achievable.

The potential cumulative ELCR from nonradiological carcinogenic COPCs is less than the target risk level of 1×10^{-4}. The potential HI for noncancer effects is less than 1 for each nonradiation worker exposure scenario.

3.5.3 Summary of Risk Estimates for Member of the Public Entry Exposure Scenario

A summary of the TEDE for radiation exposures, noncancer HI, and ELCR risk estimates for the escorted member of the public entry exposures is presented in Table 3-7.

Table 3-7. Summary of TEDE and risk estimates for member of the public entry exposure scenario.

	Radiation	Nonradiation	
Exposure Scenario	TEDE (rem/yr)	Noncancer HI	ELCR
INEEL visitor	7.0 E – 03	<1.0 E -02	3.0 E – 08
ICDF Complex visitor[a]	4.0 E – 02	9.0 E -02	1.0 E –07
Target levels	1.5 E – 02	1.0 E + 00	1.0 E – 04

a. Visitor exposure will be controlled to target level.

The TEDE for the INEEL visitor is below the radiation dose limit of 0.015 rem/yr. The INEEL visitor was assumed to be exposed to the entire ICDF landfill WAC constituent concentrations. The TEDE for the ICDF Complex visitor exceeds the radiation dose limit of 0.015 rem/yr. The ICDF Complex visitor was assumed to be exposed to the design inventory constituent concentrations only. The WAC constituent concentrations, in some instances, are many orders of magnitude greater than the design inventory constituent concentrations.

The TEDE values calculated for these exposure scenarios are based on unmitigated risk. Section 6.0 of EDF-ER-327 addresses the controls that will be implemented to ensure that visitors will be within the dose constraints.

The potential cumulative ELCR from nonradiological carcinogenic COPCs is less than the target risk level of 1×10^{-4}. The potential HI for noncancer effects is less than 1 for each nonradiation exposure scenario.

3.5.4 Summary of Risk Estimates for the General Public Exposure Scenario

The unrestricted general public exposure scenario considers exposure to a visitor located at the Highway 26 Rest Area. This unrestricted exposure scenario is a qualitative analysis based on the results of the INEEL visitor scenario. The INEEL visitor is in proximity to the ICDF Complex and shares the same source inventory and concentrations as the Highway 26 Rest Area exposed individual. The TEDE for the INEEL visitor is less than the radiation dose limit of 0.015 rem/yr. Since the rest area is considerably farther (5,630 m) from the ICDF landfill than the INEEL visitor (300 m), and exposure decreases with distance, dose estimates calculated for the INEEL visitor would also be considered protective of the Highway 26 Rest Area visitor.

The potential cumulative ELCR from nonradiological carcinogenic COPCs is less than the target risk level of 1×10^{-4}. The potential HI for noncancer effects is less than 1 for each nonradiation.

3.6 Groundwater

To ensure protection of groundwater, the ICDF Complex RAOs presented in the OU 3-13 ROD (DOE-ID 1999) require maintaining caps over the closed ICDF landfill to prevent the release of leachate to the underlying groundwater which would result in exceeding a cumulative carcinogenic risk of 1×10^{-4}, a total HI of 1; or applicable State of Idaho groundwater quality standards (i.e., maximum contaminant levels [MCLs]) in the SRPA.

Operationally, the limits that have been established to ensure protection of groundwater are contained in the ICDF landfill WAC (DOE-ID 2002a). Extensive contaminant fate and transport modeling provided the basis for developing groundwater RAO-based waste soil contaminant concentrations for the ICDF landfill. The groundwater RAOs for this activity are the MCLs promulgated under the Safe Drinking Water Act, risk-based concentrations derived from a cumulative 1×10^{-4} excess lifetime cancer risk, and risk-based concentrations derived from a HI of 1 for noncarcinogens in the SRPA. In order to demonstrate that the RAOs for the groundwater would be met, MCL levels were set in the SRPA and concentrations were back-calculated to develop the maximum concentrations allowable in the landfill (EDF-ER-275).

The SRPA beneath the ICDF Complex has been previously contaminated from other sources at INTEC. Monitoring of the unsaturated zone, as described in the *ICDF Complex Groundwater Monitoring Plan* (DOE-ID 2002f), will be used in cooperation with the results from SRPA monitoring to determine if there has been a release from the ICDF Complex, or whether contaminant concentrations may be the result of other contamination sources.

Compliance with RAOs has already been designed through the development of the acceptable WAC limits, modeled in EDF-ER-275, and presented in the landfill WAC (DOE-ID 2002a). The waste tracking process, described in PLN-914, will track the cumulative mass (which can be used to calculated total percentages) of contaminants in the landfill to ensure that the landfill WAC limits are maintained.

The ICDF Complex will demonstrate meeting the established groundwater RAOs by implementing the *ICDF Complex Groundwater Monitoring Plan* (DOE-ID 2002f) and using the monitoring results to assess compliance with MCLs, cumulative 1×10^{-4} excess lifetime cancer risk, and a HI of 1 for noncarcinogens in the SRPA. Landfill performance evaluations through leakage monitoring is also presented in the Groundwater Monitoring Plan and the O&M Sampling and Analysis Plan (DOE-ID 2003e) and will help ensure compliance with the RAOs by detecting releases from the landfill at the earliest point in time. The groundwater and leak detection monitoring that will be performed to demonstrate compliance with the RAOs is further described in Section 3.9 of this O&M Plan and in *ICDF Complex Groundwater Monitoring Plan* (DOE-ID 2002f).

In addition to the groundwater monitoring system, a Secondary Leak Detection and Recovery System will be constructed under the primary leachate collection system of the landfill to provide an early warning of leachate breaching the liner systems in place. This will allow for more timely corrective action than would be attained by monitoring the groundwater alone.

3.7 Radiological Controls

The Radiological Control Program implemented at the ICDF Complex will be in compliance with applicable codes, standards, and U.S. Department of Energy (DOE) orders, principally 10 CFR 835. These are implemented by the *INEEL Radiological Control Manual* (Radiological Control Department 2000) and procedures comprising the Radiation Protection Manual (Radiological Control Department 2002).

It is the policy of the INEEL and DOE-ID to conduct radiological operations in a manner that protects the health and safety of all its employees, contractors, and the general public. This objective is accomplished by ensuring that radiation exposures to workers and the public and that releases of radioactivity to the environment are maintained below regulatory limits and conscious efforts are taken to further reduce exposures and releases to be ALARA. The INEEL is fully committed to implementing a radiological control program of the highest quality that consistently reflects this policy.

This policy is implemented by compliance to applicable requirements, establishment of a radiation protection program and organization, an ALARA policy and program, and a radiological protection training program. It is further implemented by effective application of radiation exposure control and radiological monitoring, as well as appropriate use of radiological protection instrumentation and recordkeeping. A description of these elements is provided in the following subsections.

It is the INEEL management and operations (M&O) contractor's policy to conduct its radiological operations in a way that ensures the health and safety of all its employees and the public.

3.7.1 Requirements

The Radiological Control Program is derived from the following applicable codes, standards, and DOE orders, principally 10 CFR 835. These are implemented by the INEEL policies and standards listed below:

- 10 CFR 835, "Occupational Radiation Protection," January 1, 2001
- 40 CFR 61, "National Emission Standards for Hazardous Air Pollutants," July 1, 2000
- DOE Order 231.1, "Environment, Safety, and Health Reporting," Change #2, November 7, 1996
- DOE Order 5400.5, "Radiation Protection of the Public and the Environment," February 1990, Change 2, January 1993
- ANSI N13.6-1966, "Practices for Occupational Radiation Exposure Records," American National Standards Institute, 1966
- ANSI N323A-1997, "Radiation Protection Instrumentation Test and Calibration," American National Standards Institute, 1997
- ANSI Z88.2-1992, "Practices for Respiratory Protection," American National Standards Institute, May 19, 1992.

3.7.2 Radiation Protection Program and Organization

Line management organizations have the overall authority and responsibility for implementing and complying with the M&O contractor's radiation protection program and for ensuring that workers are adequately protected from radiological hazards. The Environment, Safety, Health, and Quality Assurance organization has overall authority and responsibility for developing and maintaining the contractor's radiation protection program. This authority and responsibility is delegated to the Radiological Controls organization, which is directly responsible for providing program direction to the contractor (hereafter referred to as company) and their line management organizations. Dosimetry and instrumentation resources are provided by the Radiological Controls organization. Groups reporting to the local area environmental, safety and health manager provide operational radiological protection coverage to line organizations. These groups provide RCT and radiological engineer support. The RCTs, radiological engineers, and other safety professionals interface through safety and health program development, reviews of work planning documents, and job hazards analyses. Staffing levels for radiation protection personnel are determined and maintained as required by specific radiation protection needs and the need to maintain an effective radiation protection program. Day-to-day implementation and application of the ICDF Complex radiation protection program is under the direction of the RCTs assigned to the project.

Excellent performance in radiological control policy is evident when radiation exposures are maintained well below regulatory limits and contamination is minimal, radioactivity is well controlled, and radiological spills and uncontrolled releases are prevented.

3.7.3 The ALARA Policy and Program

Federal law and the DOE require the ALARA concept to be implemented in the contractor's radiological control program. This requirement is implemented through the INEEL company policies and procedures for radiological control.

The ALARA process is an approach to radiological control that reduces and controls individual and collective radiation exposures of the workforce and the public. Management is committed in all activities to reducing any safety or health risks associated with hazardous substances, including ionizing radiation. This policy applies to the TEDE. All exposures are maintained as far below the limits set by DOE as social, technical, economic, practical, and policy considerations permit. Management is responsible for promoting ALARA awareness and for reducing and keeping radiation exposures ALARA.

Management uses the following methods to achieve ALARA objectives:

- Allocating the appropriate technical, administrative, and supervisory resources necessary.
- Appointing a system of ALARA committees to provide focus and direction for reducing radiological exposures.
- Appointing an ALARA coordinator to oversee and evaluate efforts and provide technical assistance to identify needed improvements.
- Establishing and tracking ALARA goals with consideration to the projected work scope for organizations and for individuals with consideration to their job functions.
- Aggressively pursuing those activities, concepts, and methods, including cost/benefit analyses that result in compliance with ALARA goals and objectives.

- Ensuring that preparations for high-radiological-consequence work include an evaluation of the use of equipment mockups, work area photos, videotapes, etc. to minimize the working time required in the actual radiation and contamination fields. The cost for these materials should be justified by dose-reduction benefits.

Routine dosimetry reports show organizational dose totals, which include individual employee dose totals and ALARA goals, and flag those employees projected to exceed or who have exceeded their ALARA goal. Reports and graphs are provided to facility managers for review of the ALARA status of personnel they supervise.

3.7.4 Radiological Protection Training

INEEL-wide policies establish the requirements to ensure that personnel have the training to work safely in and around radiological areas and to maintain their individual exposures and the exposures of others ALARA.

Visitors to the INEEL receive training or are escorted by a fully trained and qualified employee if they enter radiological areas.

3.7.4.1 Radiological Worker and General Worker Training. The plans and procedures for radiological worker and general worker training are found in the INEEL company policies and procedures for radiological protection. Facility management ensures that all individuals receive appropriate training in radiological controls for their work assignments. All individuals requiring access to radiological areas receive radiological worker training, which covers facility-specific technical and practical training and stresses their responsibilities for safely working with radioactive materials. The training emphasizes the nature of radiological conditions and control of radiation exposure and follows the DOE standardized core training materials. The level of training is based on each employee's category of involvement with radiological work and meets the requirements of 10 CFR 835.901.

Personnel who may routinely enter a controlled area and may encounter radiological barriers, postings, or materials receive General Employee Radiological Training (GERT). Radworker I or II may be substituted for GERT training.

3.7.4.2 Radiological Control Personnel Training. All radiological control personnel meet the requirements and are trained according to the terms and conditions of 10 CFR 835.901 and the INEEL company policies and procedures. The RCT qualification consists of the standardized DOE core course training material, on-the-job training per the qualification standards of the INEEL company policies and procedures, and passing scores on both final comprehensive written examination and final oral examination board. Individuals performing duties as RCTs are retrained and qualified in accordance with DOE core course requirements every 2 years. Limited or subdivided qualifications for RCTs are issued if associated provisions are identified in the qualification program.

Each employee is trained in the principles of the Voluntary Protection Program (VPP), which is intended to motivate each employee to take the responsibility for their own safety and the safety of their fellow workers. The ultimate goal of the VPP is to create a workplace free from injury and illness. In addition, each employee is empowered with stop work authority, which allows each employee to stop any work that he or she feels is unsafe or is not proceeding according to an approved procedure.

3.7.5 Radiation Exposure Control

The following subsections discuss the methods for controlling radiation exposure.

3.7.5.1 Administrative Limits. Radiation exposure limits are based on requirements contained in Subpart C of 10 CFR 835 and the INEEL company policies and procedures. An administrative control level (ACL) has been established for the INEEL. For nonaccident conditions, company management must give prior written approval for doses greater than the INEEL ACL. The administrative limit imposed by DOE is to keep worker exposure less than 2 rem/yr. DOE-Headquarters management must give prior written approval for doses greater than 2 rem/yr, but a worker will not be authorized to receive an exposure greater than 5 rem/yr. In addition, radiation workers have assigned ALARA goals. The dose limits and ALARA goals are implemented in company procedures, and apply to occupational radiation dose, which excludes doses from background, therapeutic and diagnostic radiation, medical radiation, and participation as a subject in medical research programs.

3.7.5.2 Radiological Practices. The requirements of 10 CFR 835, supplemented by ACLs and ALARA goals, establish the external radiation exposure limits.

Management specifies the responsibilities and requirements necessary to ensure that exposure of employees and visitors to radiation from all sources is ALARA and, in all cases, compliant with federal requirements. Management also has the responsibility for maintaining the documentation of the facility-specific ALARA program. The documentation demonstrates compliance with 10 CFR 835.101. All controlled areas, radiological areas, and radioactive material areas are posted in compliance with 10 CFR 835, and company procedures.

Radiological areas are determined, and their boundaries marked and posted in accordance with 10 CFR 835 as implemented by company procedures. Work is controlled by use of radiological work permits (RWPs) and other approved radiological work procedures. Appropriate radiological control practices are specified in the RWP. These practices vary widely, depending on the specific circumstances.

Areas within the ICDF Complex may be designated as Radiation Areas, Contamination Areas, High Contamination Areas, Airborne Radioactivity Areas, or Radiological Buffer Areas (RBAs) as conditions warrant. These designations are generally not permanent, but are dynamic and flexible in relation to ongoing operations and changing radiological conditions. The boundaries of these areas are adjusted as needed, increased or decreased, to reflect the actual radiological conditions of the area. Figure 3-2 for the decon treatment building and Figure 3-3 for the ICDF landfill and evaporation pond depict initial boundaries and instrumentation locations anticipated to support their Scope of Work. Revisions will be made as radiological conditions change. The areas will be managed by the RadCon organization, principally the RCTs assigned to the work area, in accordance with company procedures, training, knowledge and experience.

Work in radiological areas is typically controlled using the Radiological Control Information Management System (RCIMS). The RCIMS is a network-based data storage system that builds, provides, and maintains an extensive history of job-specific details related to a given RWP and work order/ALARA task. RWPs are generated and tracked through use of RCIMS and doses are tracked on RCIMS through electronic personal dosimeters.

3.7.5.3 Dosimetry. As implemented by company procedures, 10 CFR 835 establishes the policy, requirements, and training necessary for monitoring external and internal exposures. These procedures specify implementation of the external and internal dosimetry programs.

External dosimetry includes monitoring personnel radiation exposures from sources external to the body, including personnel monitoring, area/environmental monitoring, and facility and personnel accident monitoring. External personnel monitoring includes penetrating and nonpenetrating radiation contributions to a person's whole body and extremities, as appropriate. Thermoluminescent dosimeters (TLDs) are used to monitor external exposure. Each employee entering a radiologically controlled area is responsible for wearing the assigned TLD. In addition to the TLD, electronic-integrating pocket dosimeters and/or ionization chamber direct-reading pocket dosimeters are used. The Radiological Control Organization analyzes all external dosimetry used at the INEEL.

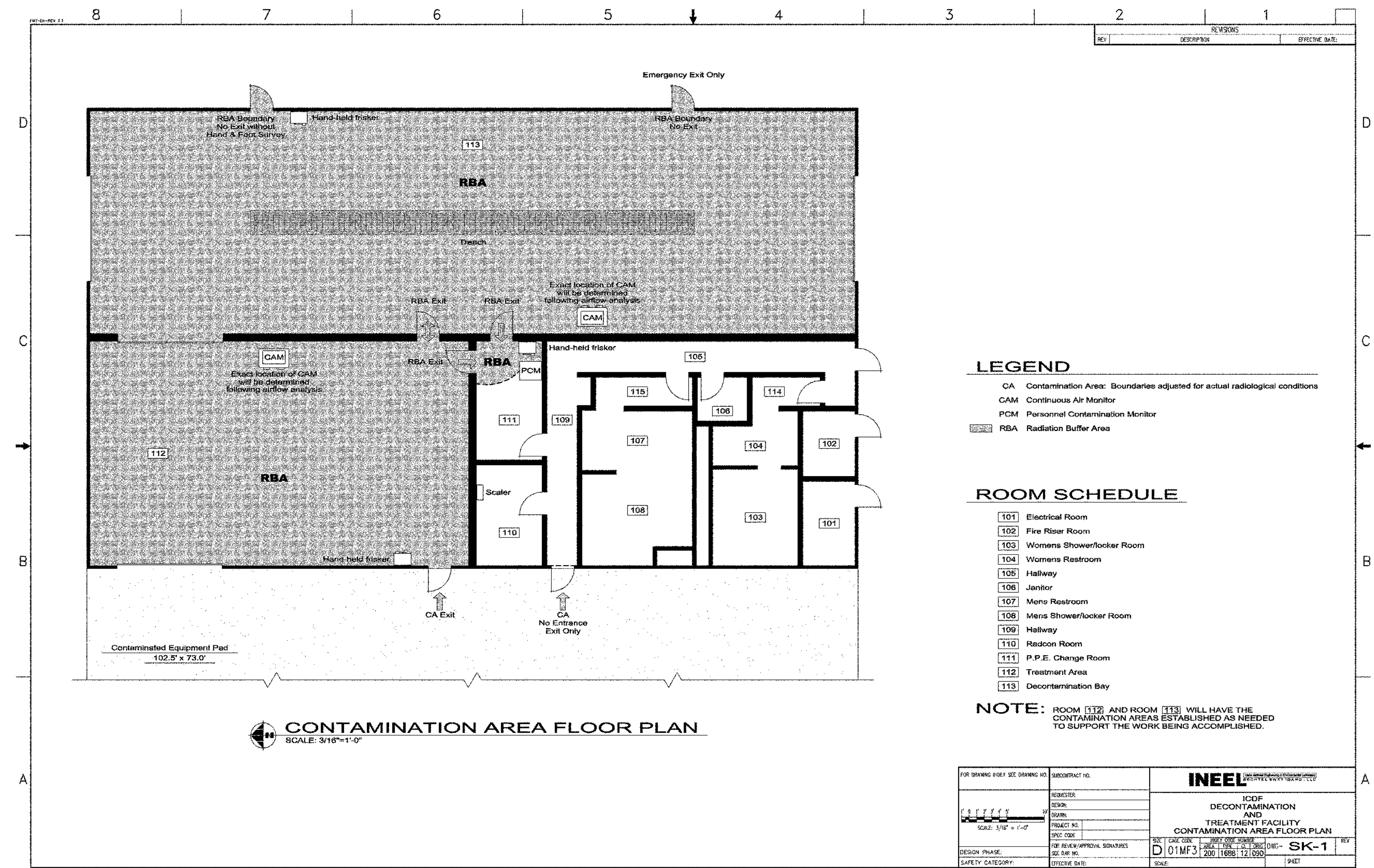

Figure 3-2. Initial decon building boundaries and instrumentation locations for ICDF operations.

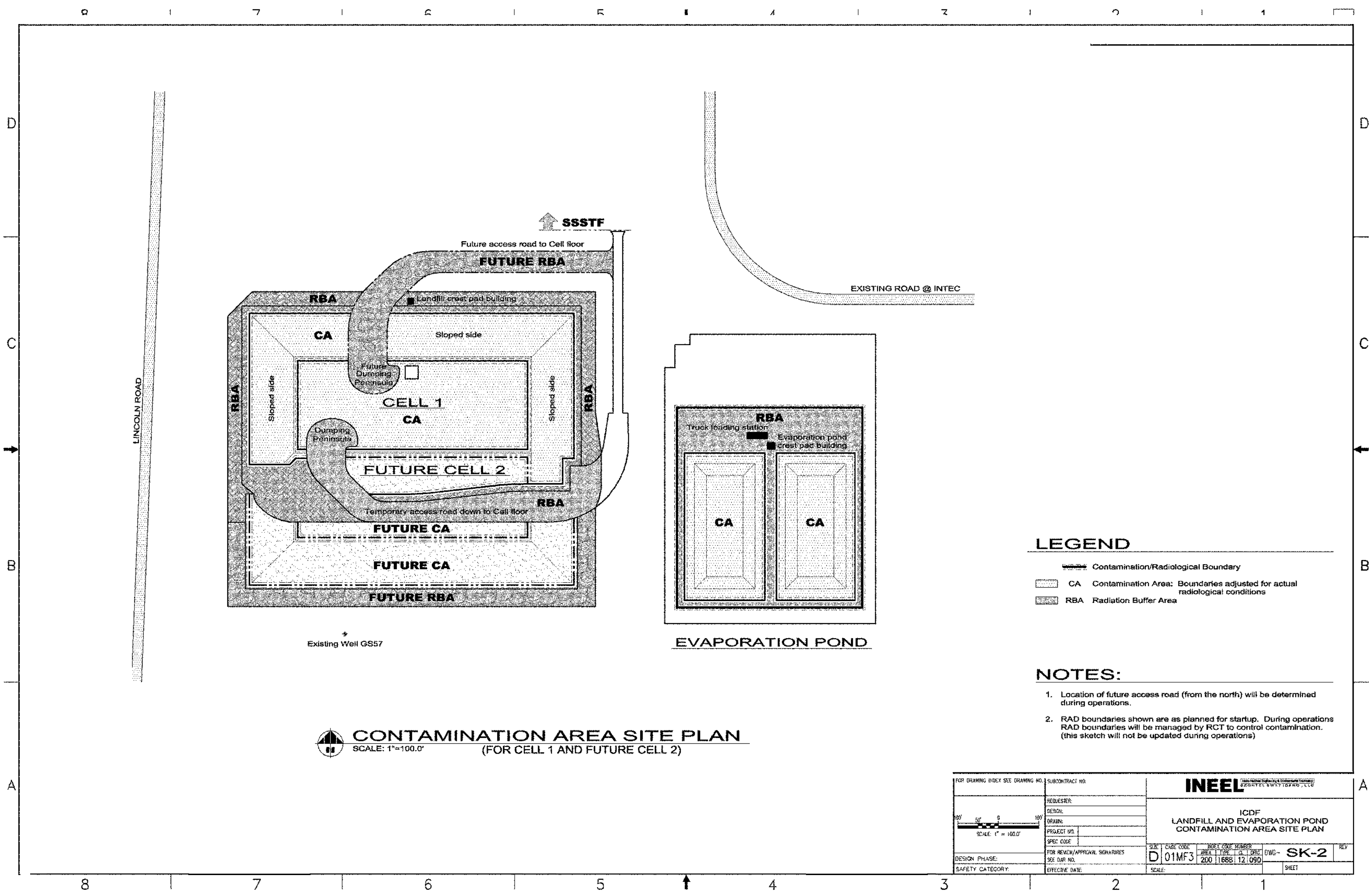

Figure 3-3. Initial ICDF landfill and evaporation pond radiological boundaries for ICDF operations.

Individuals working at nuclear facilities are categorized by job tasks and exposure potential and those that exceed the bioassay trigger level are included in the bioassay program. Employees who are likely to receive intakes resulting in a committed effective dose equivalent greater than 100 mrem undergo initial, periodic, and termination baseline whole-body counts or bioassays as appropriate. Employees who may receive intakes resulting in a measurable committed effective dose equivalent that is less than 100 mrem in a year may also be assigned to participate in routine or special bioassay sampling under the direction of the facility internal dose coordinator.

A radiological engineer assesses the radiation dose received from internally deposited radioactive materials on the basis of any bioassay results (whole-body count or biological samples). The assessment is documented and submitted to the Dosimetry Group, which manages the bioassay program and maintains a summary of the dose equivalents received from external and internal results.

3.7.5.4 Respiratory Protection. Company procedures provide guidelines for selecting respiratory protection equipment for protection against airborne radioactivity. These procedures incorporate the requirements of ANSI Z-88.2-1992, "Practices for Respiratory Protection." Respirators for radiological exposure control purposes are controlled, issued, and inspected per company procedures. All personnel who use respiratory equipment are formally trained and qualified.

3.7.6 Radiological Monitoring

As implemented by company procedures, 10 CFR 835 specifies the requirements and limits that ensure control of radiological conditions and radioactive material. Radiological monitoring and control of the conditions at facilities are performed to ensure that these limits are not exceeded.

3.7.6.1 Control of Personnel Contamination. External monitoring of the whole body for beta-gamma and/or alpha contamination is required of each person upon exit from a contamination area. Only those trained as radiation workers are permitted to monitor (frisk) themselves or others. The contamination limits, survey methods, and appropriate responses to personnel contamination are specified in 10 CFR 835, as implemented by company procedures.

Workplace monitoring is provided on both a real-time basis and through programs established to identify trends. Real-time monitoring is designed to detect and provide alarms when unusual increases in radiation or airborne radioactivity occur. The alarm alerts personnel to take immediate action to prevent or mitigate their individual exposure to the threat.

3.7.6.2 Area Airborne Radioactivity Monitoring System. The airborne radioactivity monitoring program requirements and implementing procedures are contained in company procedures. Air monitoring is performed when an individual is likely to receive an exposure of 40 or more derived air concentration (DAC) hours in a year or as necessary to characterize the airborne radioactivity hazard where respiratory protective devices for protection against airborne radionuclides have been prescribed. Continuous air monitors (CAMs) or portable air sampling equipment is utilized where persons without respiratory protection are likely to be exposed to concentrations exceeding 1 DAC or where there is a need to warn individuals of unexpected increases of airborne activities greater than 1 DAC. Company procedures contain the detailed implementation requirements of the airborne radioactivity monitoring program, including the responses to high airborne radioactivity in work areas.

3.7.7 Radiological Protection Instrumentation

Properly selected, operated, maintained, and calibrated radiological instrumentation is employed at facilities to implement an effective radiological control program. Company procedures specify the requirements for radiological instrumentation. The INEEL Radiological Control Manual defines the criteria for selection, design, procurement, and installation of radiological instrumentation. Company procedures provide calibration and operational check requirements.

Portable radiological control instruments are calibrated, maintained, and repaired at the INEEL Health Physics Instrument Laboratory. These instruments are used to identify and help control radiation, contamination, and airborne radioactivity at its source. Most of these instruments will generally be used interchangeably within various areas of the ICDF Complex. Fixed instruments are calibrated, maintained, and repaired on location using approved procedures. The following instruments are used at the various facilities, as appropriate:

- CAMs and/or portable air sampling equipment are used to monitor areas with potential for airborne radioactivity. Beta- and alpha-sensitive detectors monitor for unanticipated increases in airborne radioactivity. CAMs or portable air samplers are required in areas that could generate airborne levels greater than 1 DAC, or where a need exists to alert potentially exposed workers to unexpected increases in the airborne radioactivity levels.

- During waste handling operations, CAMs or portable air sampling equipment will be utilized to identify and/or characterize any airborne radioactivity releases from ICDF landfill, evaporation pond, and decontamination/treatment activities. Two CAMs (with one spare) will be located in the decon building, one in the decontamination bay and one in the treatment area. Portable air sampling is the preferred air monitoring method at the landfill and evaporation ponds. Portable air sampling instruments allow greater flexibility to sample areas of concern and changing wind direction versus fixed locations for CAMs, which may not always be in the wind path. Air samples will be taken downwind of the dumping activities to monitor for any airborne releases, in accordance with company procedures. Samples will also be taken in areas out of the prevailing winds to establish background levels. These samples may be taken with either low-volume (giraffe) or high-volume (grab) air samplers.

- Personnel contamination monitors (PCMs) are used with survey stations to monitor external contamination on employees and equipment at control points near exits from RBAs.

- One PCM will be positioned in the PPE change room of the decon building for personnel to perform whole body surveys at the exit from RBAs and other radiologically controlled areas, including those individuals exiting ICDF Complex areas. A stationary Geiger-Mueller (GM) counter or scintillation survey instrument will be located in the same area to survey tools, etc. and for use when the PCM is out of service for calibration or maintenance. Portable instruments will be placed in appropriate locations within the ICDF Complex for periodic personnel and equipment surveys. All personnel signed in on an RWP are expected to perform a final exit survey when leaving the ICDF Complex.

- Portable alpha monitoring instruments are used for field survey of surfaces and personnel.

- Beta-gamma monitoring instruments, which include a variety of portable beta-gamma detectors and suitable rate meters, are used for both surface and personnel monitoring.

- Low background gas flow proportional alpha-beta counters are used to count contamination smears and air filters. Most can be programmed to automatically change samples and store the results in a computer-linked database.

- At least one proportional counter will be positioned in the RadCon room at the decon building to analyze radioactivity on smears from the ICDF Complex.

- Other specialized instruments such as neutron detectors may also be used.

3.7.7.1 Calibration and Control. Calibration and control of portable radiological instrumentation provided by the Health Physics Instrument Laboratory conforms to ANSI N323A-1997, "Radiation Protection Instrumentation Test and Calibration, Portable Survey Instruments." The standards used for calibrating instrument functions, including electronic and flowmeter standards and radiation calibration sources, are directly or indirectly traceable to National Institute of Standards and Technology standards.

Portable instrumentation is calibrated before initial use, after maintenance or adjustment, following any modification or alteration that may affect instrument response, and at intervals not to exceed 1 year. Calibration is performed on other radiological instruments (nonportable or fixed) as required by company and facility-specific procedures. The current calibration label, showing the date when calibration is due, is attached to portable instruments.

The calibration status, including due date, of fixed instruments and instrumentation systems is tracked.

3.7.7.2 Operational Checks. A source check is performed on portable radiological instrumentation daily or prior to use by an RCT to verify that the instruments respond properly to radiation.

Before use, each portable survey meter is visually examined for defects, current calibration dates, and battery conditions, if the instrument has a built-in battery check. Any instrument suspected of providing incorrect in-service measurements is removed from service pending a satisfactorily passed source check or calibration. Operational checks are also performed on fixed instrumentation for proper operation, as appropriate.

Radiological instrumentation found to be defective (e.g., fails the source check) is tagged out of service to prevent inadvertent use and segregated until properly repaired, calibrated, or disposed.

3.7.7.3 Safety Precautions for Using Radiological Instrumentation. Only personnel formally trained in the use of portable radiological instrumentation are allowed to use this equipment. As a minimum, training consists of a lecture on instrument use and the meaning of its measurements, a demonstration of its proper handling, and a period of supervised use.

3.7.8 Radiological Protection Recordkeeping

Radiological protection records generated by a facility include, as a minimum, those items listed in 10 CFR 835. Inventory, survey, exposure, and air monitoring records are maintained to provide a history of radiological conditions. Records that document the appropriateness, quality, and accuracy of methods, techniques, and procedures in use during any given period are maintained per Section 6 of ANSI N-13.6, "Practices for Occupational Radiation Exposure Records Systems."

INEEL company policies and procedures provide direction on the development, management, and retention of records. Categories of radiological records include the following:

1. RadCon Policy Statements

2. RadCon Procedures

3. Individual Radiological Doses

4. Internal and External Dosimetry Policies and Procedures

5. Personnel Radiological Training

6. ALARA Records

7. Radiological Instrumentation Test, Repair, and Calibration Records

8. Radiological Surveys

9. Area Monitoring Dosimetry Results

10. RWPs

11. Radiological Performance Indicators and Assessments

12. Radiological Safety Analysis and Evaluation Reports

13. QA Records

14. Radiological Incident and Occurrence Reports

15. Accountability Records for Sealed Radioactive Sources

16. Records for Release of Material to Controlled Areas

17. Reports of Loss of Radioactive Material.

All radiological records are retained until DOE authorizes final disposition.

3.7.8.1 Dose Tracking. Tracking of exposures for workers is conducted in accordance with the INEEL Radiological Control Manual. Dosimetry reports show organizational dose totals. In addition, individual employee dose totals and ALARA goals are listed, and the names of employees who are projected to exceed, or who have exceeded, their ALARA goal are flagged.

Active employees are provided with an annual report of their dose. Upon request from a terminating employee, exposure records are provided as soon as the data are available but not later than 90 days after termination. A written estimate of the radiation dose received by the terminated employee can be provided at the time of termination if requested. Monitoring results, including zero dose, are reported to each visitor within 30 days of determining the results. Upon request, any individual may receive a current radiation dose record. Detailed information concerning any individual's exposure is available upon request by the individual, consistent with the provisions of the Privacy Act.

The INEEL Radiation Dosimetry Program retains official records of individual radiation doses. Individual dose records are normally retained for 75 years and will be retained as directed to support epidemiological studies. Records retained and reported are sufficient to support recalculation of doses at a later date.

3.7.8.2 **Airborne Radioactivity Monitoring Records.** Facilities retain airborne radioactivity monitoring records to provide a chronological historical record of the conditions under which personnel were exposed. This complies with Section 5 of ANSI N-13.6. Air monitoring records that document the appropriateness, quality, and accuracy of methods, techniques, and procedures in use during any given period are kept per Section 6 of ANSI N-13.6. Where applicable, facilities retain records per DOE requirements and RCRA permit requirements.

3.7.8.3 **Annual Radiation Dose Reports.** Individual occupational dose records and records used to assess individual doses are generated and maintained to provide appropriate reports to the employee and management and to comply with DOE Order 231.1. Records are readily available for all current employees.

Official records of radiation exposure doses are also retained. Dose assessment calculations and methods are retained by radiological control personnel.

Special investigations are used to estimate the dose received by an individual (external and/or internal) when the exposure cannot be determined by normal means. Investigation reports become part of the dose record. After an investigation, the responsible facility manager may determine that a critique report or occurrence report is required for further investigation and corrective action.

3.8 Action Leakage Rate

The ALR for the ICDF landfill was calculated in EDF-ER-269, "Leachate Generation Study." The calculated ALR for Cell 1 and Cell 2 of the ICDF landfill is 1,380 gal/day. The ALR for the ICDF evaporation pond is 1,590 gal/day for each pond cell. The ALR for the ICDF evaporation pond was calculated in EDF-ER-280, "Landfill Leachate Collection System Design Analysis."

During the operations of the ICDF Complex, ICDF Complex personnel must convert the weekly flow rate from the landfill LDRS and from the LDRS from each evaporation pond cell to a flow rate with the units of gal/day. These flow rates will be compared to the ALR for the landfill or the evaporation pond. Section 9 details the steps that are required if the calculated ALR is exceeded.

After the final ICDF landfill cover has been placed, ICDF Complex personnel must convert the monthly, quarterly, or semiannual flow rate from the landfill LDRS and from the LDRS from each evaporation pond cell (while they remain after closure of the landfill) to a flow rate with the units of gallons per day. Whether the conversion is performed using monthly, quarterly, or semiannual flow rates depends upon whether the previous volumes in the sumps have been below the operating levels of the pumps as described in 40 CFR 264.302. These landfill PLDRS and the evaporation pond LDRS flow rates will be compared to the ALR for the landfill or the evaporation pond. Section 9 details the steps that are required if the calculated ALR is exceeded. Appendix A of this O&M Plan indicates that the pump will operate as long as there is sufficient head to remove leachate. Further response actions are not identified for ALR exceedence and will be determined on a case-by-case basis, in cooperation with the Agencies.

3.9 Environmental Monitoring and Recordkeeping

CERCLA determines the applicable environmental compliance requirements in the ROD through the identification of the ARARs. The ARARs that apply to the ICDF Complex appear in Section 12.2.3 of the OU 3-13 ROD (DOE-ID 1999). To demonstrate design and construction environmental compliance, a number of ARAR compliance matrices have been presented throughout the development of previous ICDF Complex technical and functional requirements (TFRs) (TFR-17 and TFR-71). Previous ARAR compliance matrices have been centered on the design and construction requirements of the ARARs. Table 3-8 presents a matrix for those ARARs involving environmental monitoring/inspection or record/reporting operational requirements. Table 3-8 indicates the specific section and/or document that demonstrates compliance with each operational monitoring/inspection or record/reporting ARAR. The ARARs that address design or construction or ARARs for operations that do not include environmental monitoring/inspection or record/reporting requirements are not included in this table. Further discussion of ARAR compliance for ICDF Complex operations is provided in Section 4.14 of this O&M Plan.

In addition to describing the operational requirements for monitoring/inspection or record/reporting, this section also describes the environmental monitoring that will be performed for the ICDF Complex.

The types of environmental monitoring that will be performed at the ICDF Complex to obtain data necessary to operate the ICDF Complex in compliance include the following:

- Air emissions compliance calculations (NESHAP)
- Groundwater monitoring
- Other aqueous sampling (evaporation pond, landfill Leachate Collection Recovery System, pump station)
- Evaporation pond sediment sampling.

The environmental monitoring sections below briefly describe the purpose of the various types of environmental monitoring, but direct the reader to a referenced document for additional information.

No stormwater sampling from the stormwater ditches will be performed as part of ICDF Complex operations. The good housekeeping practices that are described in this O&M Plan (e.g., keep areas free of debris, free of weeds, covering staging piles, dust control measures for waste) will help the stormwater collection ditches remain contamination-free. As a best management practice, an annual radiological survey of the accessible portions of the stormwater collection/trench system will be performed to demonstrate that the "good housekeeping" practices designed into ICDF operations are effective in controlling the spread of contamination from the facility.

3.9.1 Air

There will be no environmental air monitoring performed for the ICDF Complex to monitor NESHAP or IDAPA compliance; any air monitoring that would be performed would be to obtain health and safety data and will be conducted at the discretion of the ICDF Complex health and safety officer. Necessary radiological air monitoring for the ICDF Complex is provided in Section 3.7 of this O&M Plan.

Although evaluations demonstrate that the ICDF Complex and associated remediation operations will not contribute to emissions of toxic, hazardous, and radioactive air pollutants above regulatory limits when the operational limits described in Section 3.2 and 3.3 of this O&M Plan are implemented, calculations of emissions from the ICDF Complex will be conducted to demonstrate compliance with the applicable standards. The calculations of emissions compliance from the ICDF Complex operations for NESHAP and IDAPA will be based upon the waste inventory data contained in the waste tracking system database (described in PLN-914). These air compliance calculations will be performed to demonstrate the ICDF Complex operations are protective of human health and the environment; air compliance calculations will be conducted for toxic, hazardous, and radioactive air pollutants.

Table 3-8. ICDF Complex operational monitoring and recordkeeping requirements.

ARAR	Requirement Description	Monitoring/Inspection Requirement	Record/Reporting Requirement	Compliance Demonstration
IDAPA 58.01.01.585	Rules for the control of air pollution in Idaho–hazardous air pollutants (HAPs)	Calculations will be performed using information contained in IWTS (described in PLN-914) based upon actual hazardous concentrations in waste received. Operational limits have been established for waste receipt to ensure HAPs and TAPs limits are not exceeded.	INEEL annual IDAPA emissions report.	Waste Tracking Plan for the ICDF Complex (PLN-914) Section 3 of the O&M Plan IDAPA Air Compliance Demonstration (EDF-2237)
IDAPA 58.01.01.586	Rules for the control of air pollution in Idaho–toxic air pollutants (TAPs)	Calculations will be performed using information contained in IWTS (described in PLN-914) based upon actual hazardous concentrations in waste received. Operational limits have been established for waste receipt to ensure HAPs and TAPs limits are not exceeded.	INEEL annual IDAPA emissions report.	Waste Tracking Plan for the ICDF Complex (PLN-914) Section 3 of the O&M Plan IDAPA Air Compliance Demonstration (EDF-2237)

Table 3-8. (continued).

ARAR	Requirement Description	Monitoring/Inspection Requirement	Record/Reporting Requirement	Compliance Demonstration
40 CFR 61.92 40 CFR 61.93	NESHAP for radionuclides from DOE facilities, emission monitoring and emission compliance	Calculations will be performed using information contained in IWTS (described in PLN-914) based upon actual radionuclide concentrations in waste received. Operational limits have been established for waste receipt to ensure NESHAP limits are not exceeded.	INEEL annual NESHAP report.	Waste Tracking Plan for the ICDF Complex (PLN-914) Section 3 of the O&M Plan NESHAP Compliance Demonstration (EDF-2236)
IDAPA 58.01.05.008 (40 CFR 264.14 [a], [b], [c])	Site security	Fence will be inspected to confirm it is in good repair.	Fence inspection checklists will be maintained in the ICDF Complex project records.	Section 4 of the O&M Plan Section 8 of the O&M Plan Section 10 of the O&M Plan
IDAPA 58.01.05.008 (40 CFR 264.15 [a], [c])	General inspection requirements	Routine inspections will be performed to identify malfunctions, deterioration, operator errors, and discharges which may lead to the release of hazardous constituents or threat to human health.	General inspection checklists will be maintained in the ICDF Complex project records.	Section 8 of the O&M Plan Section 10 of the O&M Plan
IDAPA 58.01.05.008 (40 CFR 264.92)	Groundwater protection standard	Groundwater monitoring as outlined in 40 CFR 264.97.	Groundwater monitoring data collected in accordance with 40 CFR 264.97 (g) will be maintained in the ICDF Complex project records.	ICDF Complex Groundwater Monitoring Plan (DOE-ID 2002f)

Table 3-8. (continued).

ARAR	Requirement Description	Monitoring/Inspection Requirement	Record/Reporting Requirement	Compliance Demonstration
IDAPA 58.01.05.008 (40 CFR 264.93)	Hazardous constituents	Groundwater monitoring as outlined in 40 CFR 264.97.	Groundwater monitoring data collected in accordance with 40 CFR 264.97 (g) will be maintained in the ICDF Complex project records.	ICDF Complex Groundwater Monitoring Plan (DOE-ID 2002f)
IDAPA 58.01.05.008 (40 CFR 264.97)	General groundwater monitoring requirements	Groundwater monitoring as outlined in 40 CFR 264.97.	Groundwater monitoring data collected in accordance with 40 CFR 264.97 (g) will be maintained in the ICDF Complex project records.	ICDF Complex Groundwater Monitoring Plan (DOE-ID 2002f)
IDAPA 58.01.05.008 (40 CFR 264.98)	Detection monitoring program	Groundwater detection monitoring as outlined in 40 CFR 264.98.	Agencies will be notified if there is an indication of statistically significant increase; compliance monitoring may be invoked.	ICDF Complex Groundwater Detection Monitoring Program: Data Analysis Plan (DOE-ID 2003f)
IDAPA 58.01.05.008 (40 CFR 264.301)	Leachate depth over the liner does not exceed 30 cm (1 ft)	Requirements for Leachate Collection Recovery System, and Leak Detection System.	No record/report required.	Section 4 of the O&M Plan Section 8 of the O&M Plan
IDAPA 58.01.05.008 (40 CFR 264.309[a] and [b])	Surveying and recordkeeping	No monitoring/inspection required.	Must maintain an operating record, which includes a map of the exact locations and dimensions, including depth of each cell with permanently surveyed benchmarks, and the contents of each cell and the approximate location of each hazardous waste type within each cell.	Section 4 of the O&M Plan Section 10 of the O&M Plan Waste Placement Plan (EDF-ER-286) Waste Tracking Plan for the ICDF Complex (PLN-914)

Table 3-8. (continued).

ARAR	Requirement Description	Monitoring/Inspection Requirement	Record/Reporting Requirement	Compliance Demonstration
IDAPA 58.01.05.008 (40 CFR 264.310[b][1][4] [5] and [6])	Closure and postclosure care	Weekly inspection of leak detection system. Continue to monitor groundwater.	Record amount of liquids after closure at least weekly. Continue recordkeeping described in groundwater monitoring plan.	Section 9 of the RAWP (DOE-ID 2003a) Section 8 of the O&M Plan ICDF Complex Groundwater Monitoring Plan (DOE-ID 2002f)
IDAPA 58.01.05.008 (40 CFR 264.302)	Landfill action leakage rate	Weekly calculations of average daily flow rate for each sump.	Record of the daily average flow rate and the comparison to the ALR.	Section 3 of the O&M Plan Section 4 of the O&M Plan
IDAPA 58.01.05.008 (40 CFR 264.553)	Temporary units	Inspections will be performed as required based upon the waste in the area.	Waste volume within the unit, entry dates of the waste.	Waste Tracking Plan for the ICDF Complex (PLN-914) Section 4 of the O&M Plan Section 5 of the O&M Plan Section 8 of the O&M Plan Section 10 of the O&M Plan
IDAPA 58.01.05.008 (40 CFR 264.554)	Staging piles	Inspections will be performed as required based upon the waste in the area.	Waste volume within the unit, entry dates of the waste.	Waste Tracking Plan for the ICDF Complex (PLN-914) Section 4 of the O&M Plan Section 5 of the O&M Plan Section 8 of the O&M Plan Section 10 of the O&M Plan
IDAPA 58.01.05.008 (40 CFR 264 Subpart I)	Use and management of containers	Weekly inspections of storage areas and containers.	Maintain inspection checklists.	Section 8 of the O&M Plan Section 10 of the O&M Plan

Table 3-8. (continued).

ARAR	Requirement Description	Monitoring/Inspection Requirement	Record/Reporting Requirement	Compliance Demonstration
IDAPA 58.01.05.008 (40 CFR 264 Subpart DD)	Containment of hazardous waste within the building Maintain primary barrier free of significant cracks, gaps or other deterioration Maintain level of stored-treated waste not to exceed the height of the containment wall Control movement out of hazardous waste out of the building Control fugitive emissions	Weekly inspection of data gathered from monitoring equipment and leak detection equipment. Inspection to certify compliance with requirements. Weekly inspection of facility's operating record. Weekly inspection of containment building and area immediately surrounding containment building for release	Maintain record of all inspections and certifications in facility operating record. Maintain record of all repairs conducted. Record any discovery of condition that would lead to or has caused a release of hazardous waste. Notify Agencies of any release. All repairs and construction must be certified by a qualified registered professional engineer. Maintain record of waste flow-through.	Section 4 of the O&M Plan Section 8 of the O&M Plan Section 9 of the O&M Plan Section 10 of the O&M Plan Waste Tracking Plan for the ICDF Complex (PLN-914)
IDAPA 58.01.05.008 (40 CFR 264.221)	Surface impoundments	Leak detection monitoring system. Weekly inspections. Inspections after storms.	Sump levels and pond level readings. Certification of design and monitoring systems. Record amount of liquid removed from leak detection sump at least once each week. Calculate average daily flow rate for each sump at least weekly.	Section 4 of the O&M Plan Section 8 of the O&M Plan Section 10 of the O&M Plan

Table 3-8. (continued).

ARAR	Requirement Description	Monitoring/Inspection Requirement	Record/Reporting Requirement	Compliance Demonstration
IDAPA 58.01.05.008 (40 CFR 264.552)	Corrective Action Management Units	Leak detection monitoring system. Weekly inspections. Inspections after storms.	Sump levels and pond level readings. Certification of design and monitoring systems. Record amount of liquid removed from leak detection sump at least once each week. Calculate average daily flow rate for each sump at least weekly.	Section 4 of the O&M Plan Section 8 of the O&M Plan Section 10 of the O&M Plan
IDAPA 58.01.05.008 (40 CFR 264 Subpart F)	Releases from Solid Waste Management Unit (groundwater monitoring)	Monitoring in accordance with 40 CFR 264.92, .93, .95, .97, and .98.	Records and reporting in accordance with 40 CFR 264.92, .93, .95, .97, and .98.	Section 3 of the O&M Plan ICDF Complex Groundwater Monitoring Plan (DOE-ID 2002f)
IDAPA 58.01.05.00 (40 CFR 264 Subpart G)	Closure-postclosure	Monitoring for postclosure will be in accordance with the detailed ARARs cited above.	Survey plat filed with the local zoning authority.	Section 9 of the RAWP (DOE-ID 2003a) Section 8 of the O&M Plan Section 10 of the O&M Plan

Toxic and hazardous air pollutant compliance can be calculated on a daily basis by tracking the quantity of toxic air pollutants disposed in the landfill and evaporation pond. Using the operational limit information presented in Section 3.2 and in EDF-2237, toxic and hazardous air pollutant emissions will be maintained at less than the IDAPA standards.

NESHAP compliance calculations will be conducted annually for the ICDF Complex, which will be a component of the annual INEEL NESHAP report. The approach for the NESHAP calculation, which is based upon tracking the quantity of radionuclides disposed in the landfill and evaporation pond, is provided in EDF-2236.

3.9.2 Groundwater

Groundwater monitoring requirements for ICDF Complex operations are in the *ICDF Complex Groundwater Monitoring Plan* (DOE-ID 2002f). The Groundwater Monitoring Plan discusses regulatory requirements and all aspects of groundwater sampling and analysis, including sample locations, frequencies, handling, analytes, quality assurance/quality control (QA/QC), and analytical techniques. The Groundwater Monitoring Plan also specifies data validation, reporting, and data and waste management.

Groundwater monitoring will be conducted for the ICDF Complex in the SRPA and in the unsaturated zone beneath the ICDF Complex to determine whether ICDF waste disposal operations have resulted in a release of contaminants to the environment beneath the landfill or evaporation pond that exceed RAOs in the SRPA. Table 3-9 provides the sampling schedule, frequency, and analyte list for groundwater monitoring of the SRPA and perched water. Perched water will only be sampled and analyzed when sufficient water exists. Table 3-9 is for the operational period of the ICDF Complex; this table may be revised sometime in the future to address groundwater monitoring for the closure and postclosure period of the ICDF Complex.

Table 3-9. Sampling schedule and analyte list for detection monitoring in the SRPA and perched water.

Sampling Period	Sampling Frequency	Analytes
Baseline	Four independent samples	Field parameters (pH, specific conductance, and temperature) Appendix IX (40 CFR 264) volatile and semivolatile organic compounds (VOCs and SVOCs) Radionuclides (H-3, I-129, Tc-99, Sr-90, Pu-238, Pu-239/240, U-234, U-235, U-238, gamma spectroscopy) Appendix IX metals, filtered and unfiltered Major cations and anions (calcium, potassium, magnesium, sodium, nitrate, sulfate, bicarbonate, chloride)
Years one and beyond of ICDF Complex operations	Quarterly for first year; semiannual thereafter	Field parameters (as above) Mercury and total chromium, field-filtered Radionuclides (Sr-90 and Tc-99) Appendix IX VOCs
Years one and beyond of ICDF Complex operations	Every 2.5 years	In addition to the parameters above for semiannual: Appendix IX SVOCs Radionuclides (I-129, Pu-238, Pu-239/-240, U-234, U-235, U-238) Major cations and anions (as above)

In addition to the groundwater sampling, sump sampling will be conducted to collect samples from both the LCRS sump and the SLDRS sumps. It is important to be able to detect a release from the ICDF landfill at the earliest point in time. Leachate monitoring serves this purpose by determining what contaminants exist in the landfill and can be used as a line of evidence to support determination of whether increased concentrations in groundwater are the result of a release from the ICDF landfill or another source. Because baseline sampling of the LCRS and SLDRS cannot be performed prior to construction of the ICDF landfill, sampling of these locations will begin in the first year of operation of the ICDF Complex. Samples of the SLDRS sump and LCRS sump will be analyzed for the constituents listed in Table 3-10.

Six SRPA wells will be monitored in the vicinity of the ICDF Complex, including one existing upgradient monitoring well and five new monitoring wells that were installed south of the ICDF Complex. Six new perched water wells have been installed at the locations shown in the Groundwater Monitoring Plan. There are up to three completions in each perched water well to add to the existing system of perched monitoring wells within WAG 3. Four rounds of background samples have been collected from the SRPA wells and from the three perched water wells that were not dry. Water levels will be checked in the perched water wells during routine monitoring of the SRPA wells. If sufficient water is available, samples will be collected in accordance with the Groundwater Monitoring Plan (DOE-ID 2002f).

Table 3-10. Sampling schedule and analyte list for Leachate Collection Recovery System and Secondary Leak Detection and Recovery System.

Sampling Location	Sampling Media (Frequency)	Analytes
LCRS sump	Leachate (monthly)	^{129}I
		Field parameters (pH, specific conductance)
LCRS sump	Leachate (twice each year[a])	Appendix IX (40 CFR 264) volatile and semivolatile organic compounds
		Appendix IX metals plus Ca, K, Mg, Na (filtered)
		Appendix IX OC pesticides and PCBs[b]
		Appendix IX OC herbicides[b]
		Appendix IX OP pesticides[b]
		Appendix IX PCDDs/PCDFs[b]
		Radionuclides (^{3}H, ^{129}I, ^{99}Tc, ^{90}Sr, $^{239/240}$Pu, ^{238}Pu, ^{234}U, ^{235}U, ^{238}U, gamma spectroscopy)
		Major anions (nitrate, sulfate, bicarbonate, chloride)
		Field parameters (pH, specific conductance, and temperature)
SLDRS	Liquid (semiannual)	Specific conductivity

a. Sampling frequency increased to four times each year when action limit from Table 2 in the ICDF Complex Operational and Monitoring SAP (DOE-ID 2003e) is exceeded for any constituent.
b. Analyses will be performed for only those analytes known to have been disposed to the landfill or evaporation pond.

Notes:
PCDD = polychlorinated dibenzo-p-dioxin.
PCDF = polychlorinated dibenzofuran.
OC = organochlorine.
OP = organophosphorus.

The groundwater monitoring program will continue throughout the active life of the ICDF Complex and through the ICDF Complex closure period. The active life of the ICDF Complex is estimated to continue for 10 to 15 years beginning in 2003 (although current DOE-ID initiatives may accelerate the operational schedule). The closure period for the ICDF Complex is estimated to continue 30 years past discontinuation of waste disposal at the ICDF Complex (through 2048). Monitoring of the ICDF landfill following the closure period will be conducted in coordination with the long-term monitoring of the broader INTEC facility and ROD requirements to ensure that RAOs are maintained in the SRPA beyond the year 2095.

3.9.3 Other Aqueous Sampling and Evaporation Pond Sediment Sampling

In addition to the LCRS sampling described above, the ICDF Complex Operational and Monitoring Sampling and Analysis Plan (DOE-ID 2003e) addresses the collection of environmental data to determine whether the concentration of specific constituents present in the water and sediment in the evaporation pond meets the concentration-based evaporation pond WAC for these constituents. The evaporation pond WAC provide the basis for the limiting concentrations of radioactive and nonradioactive constituents that may be present in the aqueous wastes in the evaporation pond. Compliance with the evaporation pond WAC will ensure protection of human health and the environment (DOE-ID 2002c). Liquid and sediment samples collected from the evaporation pond will be used to compare to the evaporation pond WAC, will be used as an assessment of operations, and will provide supplementary data for leak evaluation programs. The environmental data collected from the evaporation pond liquid will also be used to support the annual NESHAP compliance calculations for the ICDF Complex. Evaporation pond water and sediments will be sampled and analyzed annually for arsenic, selenium, vanadium, and zinc to address ecological issues described in Section 3.4 of this O&M Plan. Evaporation pond water will be sampled annually to determine whether the concentrations exceed the operational limits established to ensure compliance with IDAPA 58.01.01.585 and 58.01.01.586 requirements for the toxic air pollutants. Details of the evaporation pond sampling are in ICDF Complex Operational and Monitoring Sampling and Analysis Plan (DOE-ID 2003e).

The ICDF Complex Operational and Monitoring Sampling and Analysis Plan (DOE-ID 2003e) addresses landfill leachate sampling that will be performed for the LCRS. The LCRS will be sampled twice each year for the same baseline constituents that will be sampled in the SRPA and monthly for key indicator parameters (see Table 3-10 above). These data will be used as QA that the total contaminant mass disposed to the landfill produces leachate that poses an acceptable risk to the SRPA. LCRS data will be used to assess and predict the performance of the landfill and may be used in determination of worker safety issues for operations and maintenance (e.g., any potential worker exposure issues that may arise in the crest pad buildings). These data will be used to develop the annual Material Profile required by Section 3.5 of the evaporation pond WAC (DOE-ID 2002c). In addition, these data will be used to identify signature constituents in the leachate. Details of these sampling data needs are provided in ICDF Complex Operational and Monitoring Sampling and Analysis Plan (DOE-ID 2003e).

ICDF Complex Operational and Monitoring Sampling and Analysis Plan (DOE-ID 2003e) also describes the sampling of the treatment unit sump to assess the contribution of the sump to the overall evaporation pond concentrations.

3.10 Sampling and Analysis/Sampling Quality Assurance

There are four Sampling and Analysis Plans (SAPs) for the ICDF Complex, each concerning different operational and/or compliance areas. These four SAPs address the collection of data of known quality as required by the EPA and the IDEQ for ICDF Complex operations.

3.10.1 Operational and Monitoring SAP

ICDF Complex Operational and Monitoring Sampling and Analysis Plan (DOE-ID 2003e) describes the ICDF Complex periodic sampling of the landfill leachate via the LCRS, evaporation pond water and sediment, and the pump station (near the decon building). These data are used to assess/predict the performance of the landfill (including QA of the waste disposed to the landfill), as well as in determination of worker safety issues for operations and maintenance. The data will be used to track waste inventory in accordance with the evaporation pond WAC (DOE-ID 2002c) and to monitor contaminant concentrations relative to operational limits. In addition these data will also be used for routine monitoring for worker exposure risk, for performing NESHAP calculations, and for monitoring ecological COPCs.

3.10.2 ICDF Groundwater Monitoring Plan

ICDF Groundwater Monitoring Plan (DOE-ID 2002f) includes monitoring of the detection system installed in the SRPA. Samples will be collected from the groundwater monitoring wells to monitor releases from the ICDF landfill and evaporation pond. The ICDF detection monitoring program will use either prediction intervals as allowed in 40 CFR 264.97(h)(3) or control charts as allowed in 40 CFR 264.97(h)(4) to evaluate the groundwater monitoring data for statistically significant evidence of contamination. The specific method to be used for each constituent will be determined from the results of the background sampling and existing literature on constituent distributions.

3.10.3 Waste Verification Sampling and Analysis Plan

The Waste Verification Sampling and Analysis Plan (DOE-ID 2003c) defines the verification sampling and analysis required for various types of wastes destined for the ICDF Complex for soil wastes disposed in the landfill. Verification sampling and analysis of the waste is the independent confirmation that the wastes are within the applicable Material Profile and below the associated WAC.

3.10.4 SAP for SSSTF Waste Stabilization Operations

The objective of the Sampling and Analysis Plan for SSSTF Waste Stabilization Operations (DOE-ID 2003g) is to ensure that all stabilized soils meet "Alternative LDR Treatment Standards for Contaminated Soils" (40 CFR 268.49) prior to disposal in the ICDF landfill. Two sampling and analysis tasks are described in this SAP, based on the treatment unit operational practices and data requirements for the stabilization of waste soil. Samples of stabilized soil from treatability studies will be collected and analyzed to verify the stabilization mixture and process prior to waste delivery to the treatment unit. Sampling and analysis of the stabilized soils will also be conducted using the sampling frequency in the plan for the batches of soil following treatment to confirm the results of the stabilization process.

3.10.5 Quality Assurance

The four SAPs were prepared in accordance with the *Quality Assurance Project Plan for Waste Area Groups 1, 2, 3, 4, 5, 6, 7, 10, and Inactive Sites* (DOE-ID 2002g). The Quality Assurance Project Plan (QAPjP) meets EPA requirements for project QA and quality control, which include the standard laboratory analytical methods used for sample analysis, and field collection methods including sample-holding times, sample sizes, and preservation.

The SAP development employed the data quality objective (DQO) process, a systematic planning tool developed by EPA for establishing criteria for data quality and for developing data collection designs. The seven iterative steps of the DQO process yield a set of principal study questions and decision statements that must be answered to address a primary problem statement. For the SAPs, the process ultimately facilitated the development of sampling designs that will allow decisions to be made within specified decision error limits.